VOLUME XXXIX
NUMBER ONE

THE NATIONAL GEOGRAPHIC MAGAZINE

JANUARY, 1921

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To carry out the purpose for which it was founded thirty-three years ago, the National Geographic Society publishes this Magazine. All receipts from the publication are invested in the Magazine itself or expended directly to promote geographic knowledge and the study of geography. Articles or photographs from members of the Society, or other friends, are desired. For material that the Magazine can use, generous remuneration is made. Contributions should be accompanied by an addressed return envelop and postage, and be addressed: Editor, National Geographic Magazine, 16th and M Streets, Washington, D. C.

Important contributions to geographic science are constantly being made through expeditions financed by funds set aside from the Society's income. For example, immediately after the terrific eruption of the world's largest crater, Mt. Katmai, in Alaska, a National Geographic Society expedition was sent to make observations of this remarkable phenomenon. So important was the completion of this work considered that four expeditions have followed and the extraordinary scientific data resultant given to the world. In this vicinity an eighth wonder of the world was discovered and explored—"The Valley of Ten Thousand Smokes," a vast area of steaming, spouting fissures, evidently formed by nature as a huge safety-valve for erupting Katmai. By proclamation of the President of the United States, this area has been created a National Monument. The Society organized and supported a large party, which made a three-year study of Alaskan glacial fields, the most remarkable in existence. At an expense of over $50,000 it has sent a notable series of expeditions into Peru to investigate the traces of the Inca race. The discoveries of these expeditions form a large share of the world's knowledge of a civilization which was waning when Pizarro first set foot in Peru. Trained geologists were sent to Mt. Pelee, La Soufriere, and Messina following the eruptions and earthquakes. The Society also had the honor of subscribing a substantial sum to the historic expedition of Admiral Peary, who discovered the North Pole April 6, 1909. Not long ago the Society granted $20,000 to the Federal Government when the congressional appropriation for the purchase was insufficient, and the finest of the giant sequoia trees of California were thereby saved for the American people and incorporated into a National Park.

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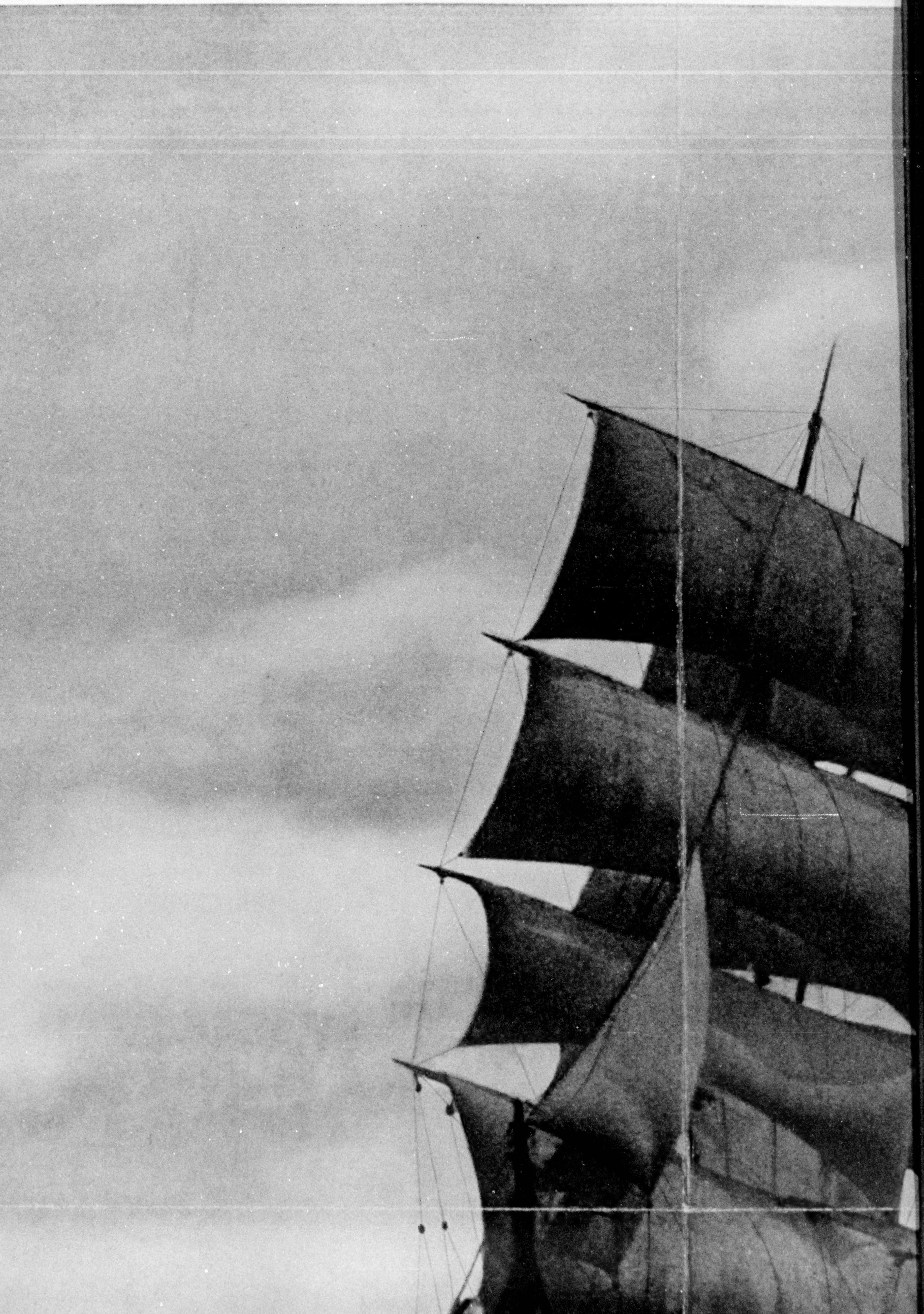

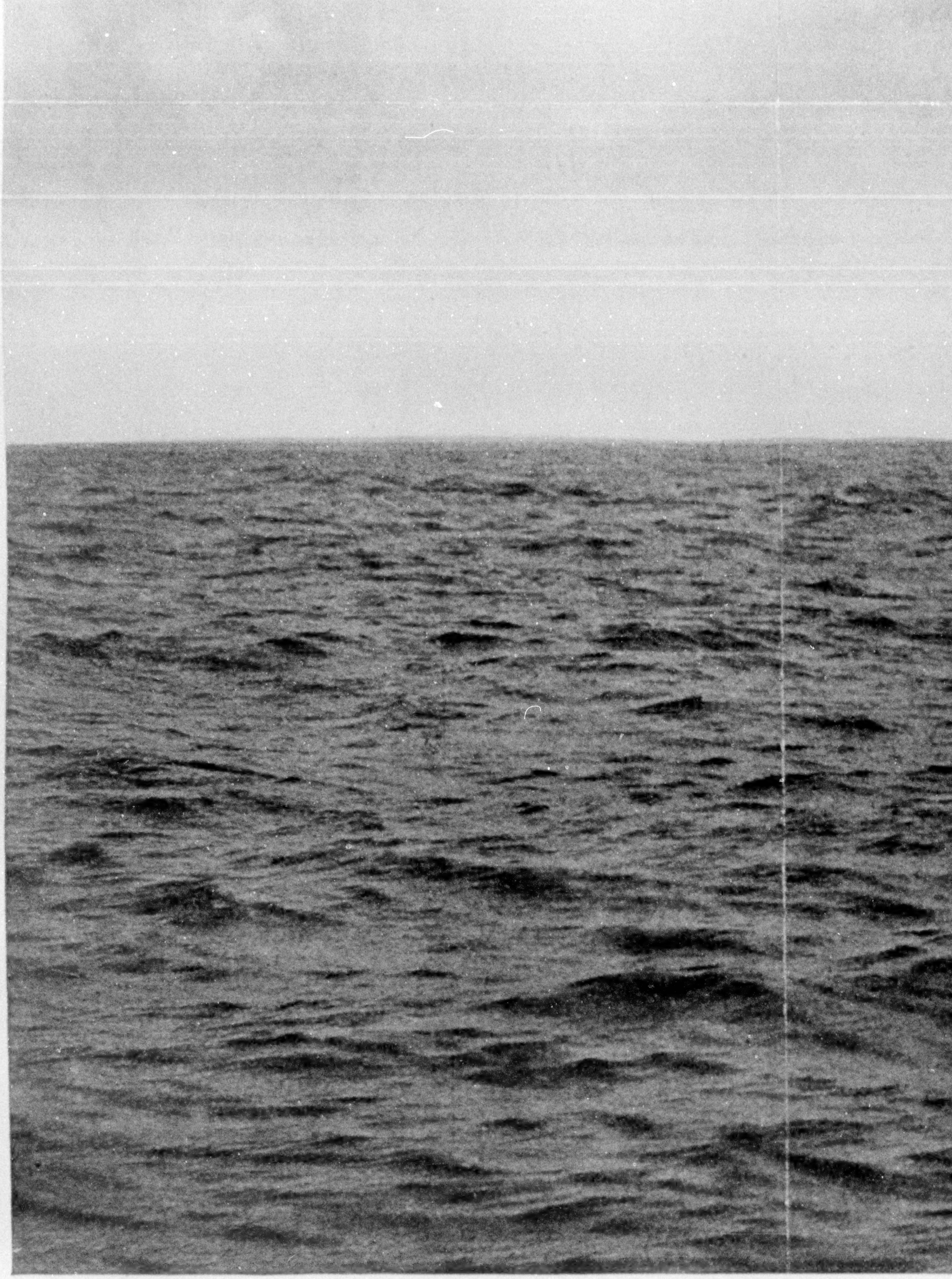

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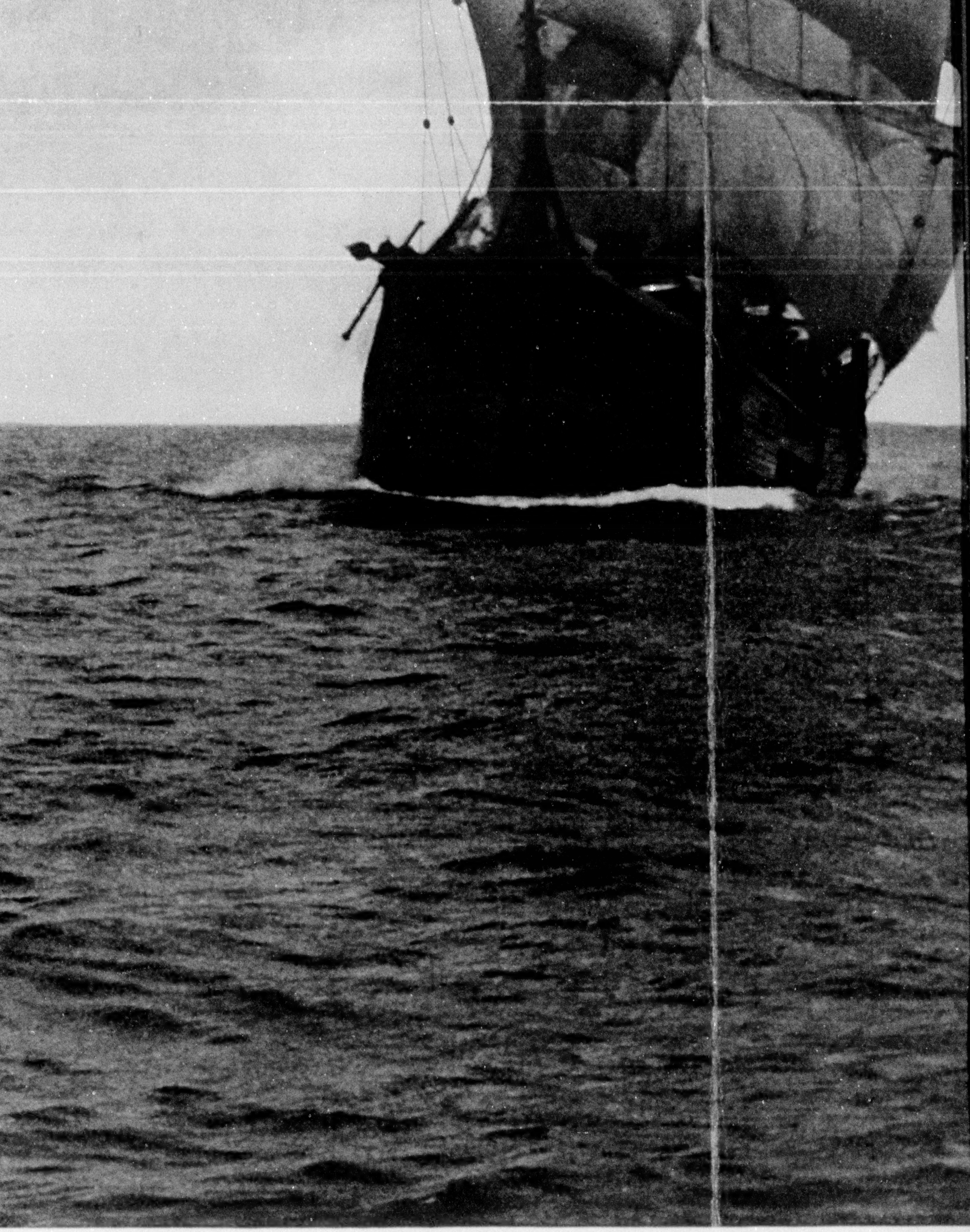

THE ARGOSY OF GEOGRA

A photograph of an almost obsolete type of old square-rigg
April 26th 1920, in mid-Gulf Stream between Florida an
To such craft the world owes much of its knowledge of

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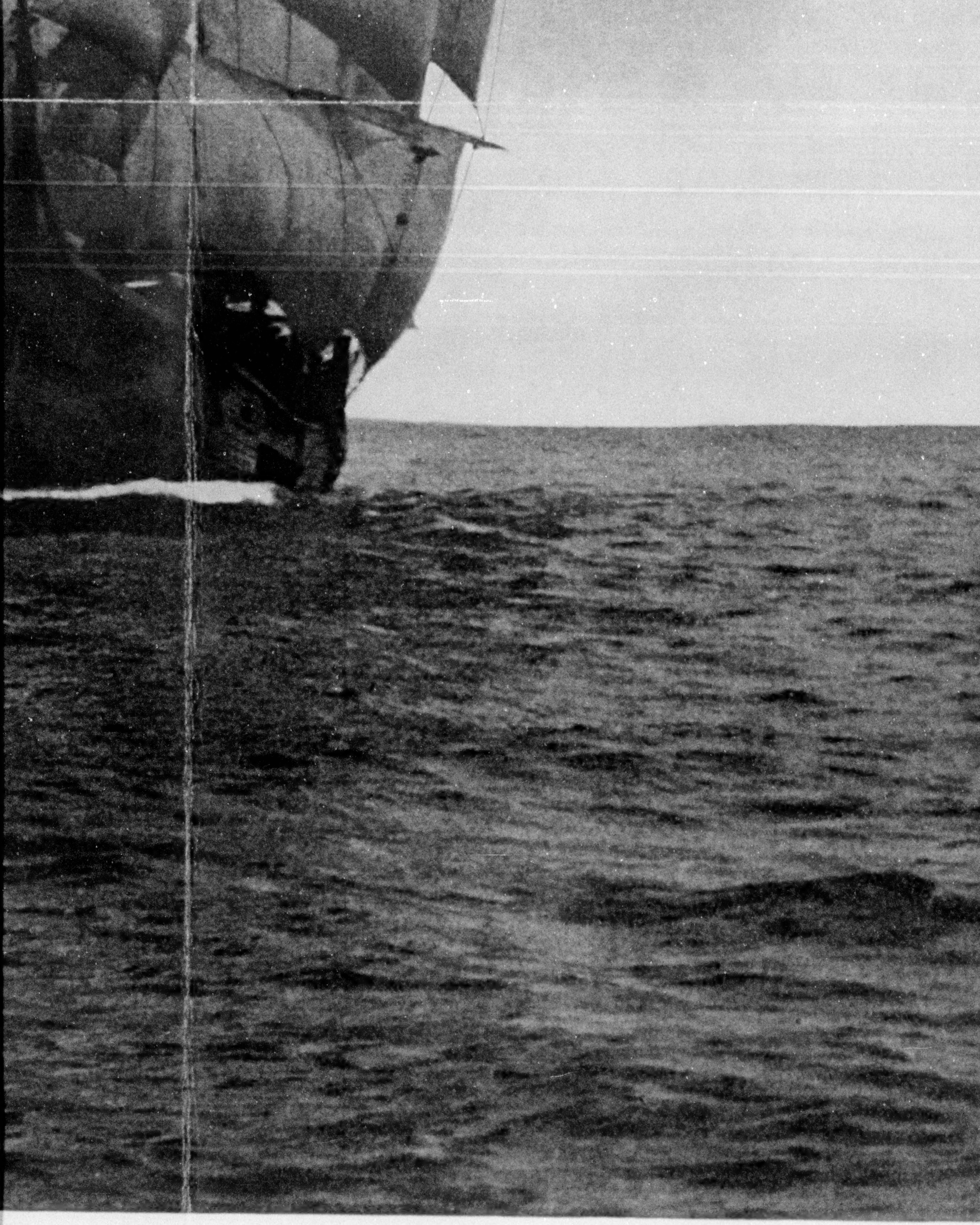

ARGOSY OF GEOGRAPHY

almost obsolete type of old square-rigged sailing ship taken
mid-Gulf Stream between Florida and the Bahama Islands.
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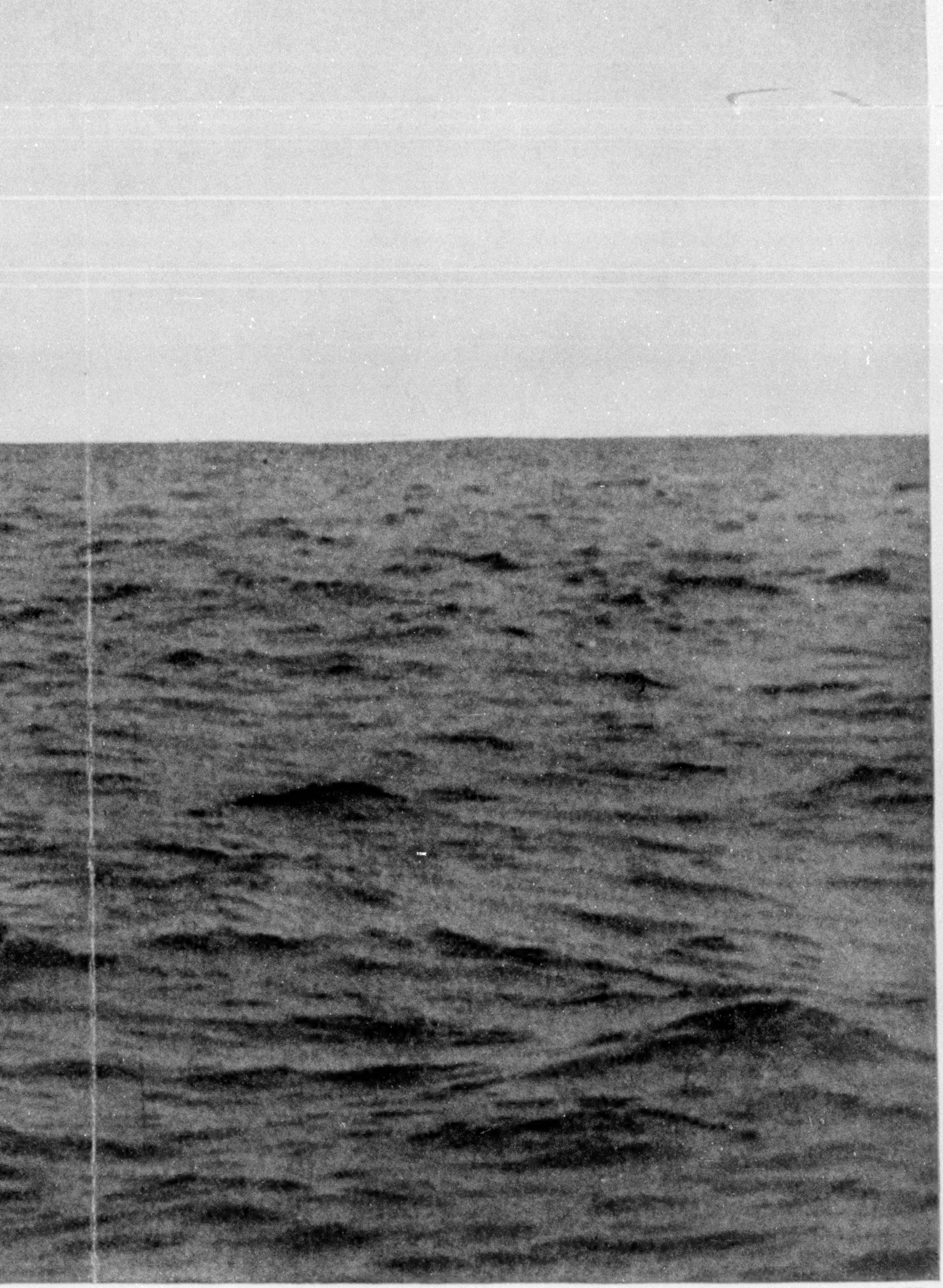

PHOTOGRAPHED BY JOHN OLIVER LA GORCE

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Hamilton Watch

"The Watch of Railroad Accuracy"

What King Albert Learned from an American Engineer

King Albert of Belgium—in the cab window—rode on the Twentieth Century Limited engine for eighty-eight miles, between Toledo and Elkhart. He inspected the mechanism; he learned the method by which the engine while in motion scooped water; he sat in the engineer's seat and ran the engine.

As they approached Elkhart, Engineer J. A. Lux—he appears in the gangway—pulled out his watch. His Majesty consulted his and they compared time. After one look, "What watch do you carry?" asked King Albert. "A Hamilton," answered Lux. "Is it a good one?" inquired His Majesty. "Well, I've run trains by it for twenty-five years," said Engineer J. A. Lux.

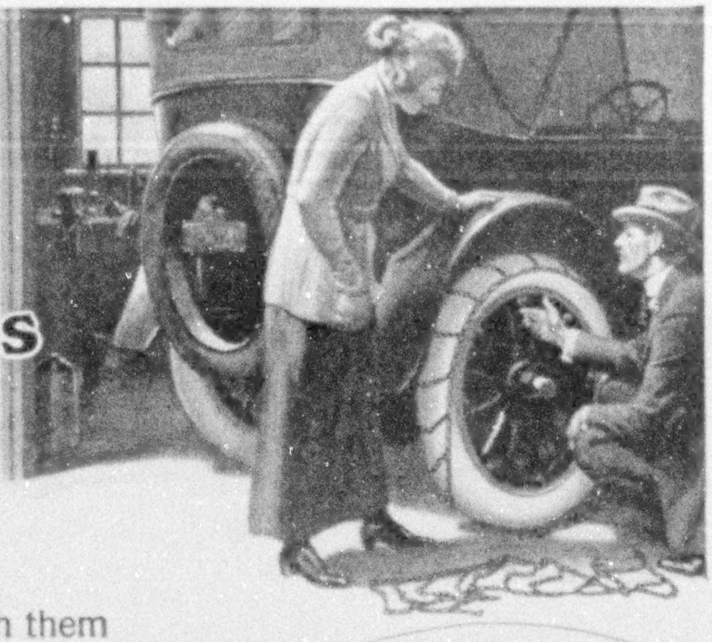
King Albert put away his watch. Before leaving America he bought a Hamilton.

Watches so accurate that engineers run the crack trains by them are watches that kings will buy.

There are many Hamilton models—from sturdy railroad types to ladies' beautiful bracelet watches. Prices range from $40 to $200; movements alone, $22 (in Canada, $27) and up. Send for "The Timekeeper," an interesting booklet about the manufacture and care of fine watches. The different Hamiltons are illustrated, and prices given.

HAMILTON WATCH COMPANY, *Lancaster, Pennsylvania*

Practice Putting on— WEED Tire Chains in the Garage

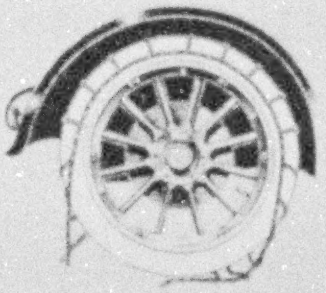


It only takes a few moments to attach them when you know how. No jack required. Study the directions illustrated on the right.

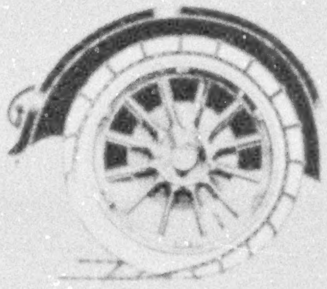
If you have never followed our instructions for attaching Weed Tire Chains, packed with every pair, you probably have fumbled around, got hot under the collar and falsely accused them of being a nuisance. Learn how easy it is to put Weed Chains on correctly — *practice in the garage* and instruct your wife, your sister or your daughter. It will repay you in security, satisfaction and comfort.

Weed Chains are also made to meet the demand for an efficient traction and anti-skid device for trucks equipped with single and dual solid tires or with the very large pneumatic tires. They are so constructed that they satisfactorily meet the requirements of heavy truck service in mud, sand or snow.

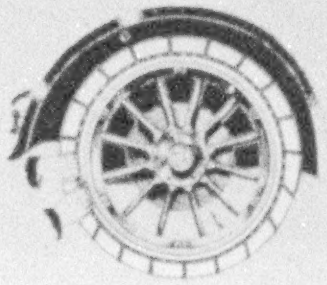
Observe these three fundamentals



Lay chains over wheel with hooks toward rear, and tuck the slack under front part of wheel.



Start car forward just enough to run over slack ends.



Hook chains as tightly as possible by hand.

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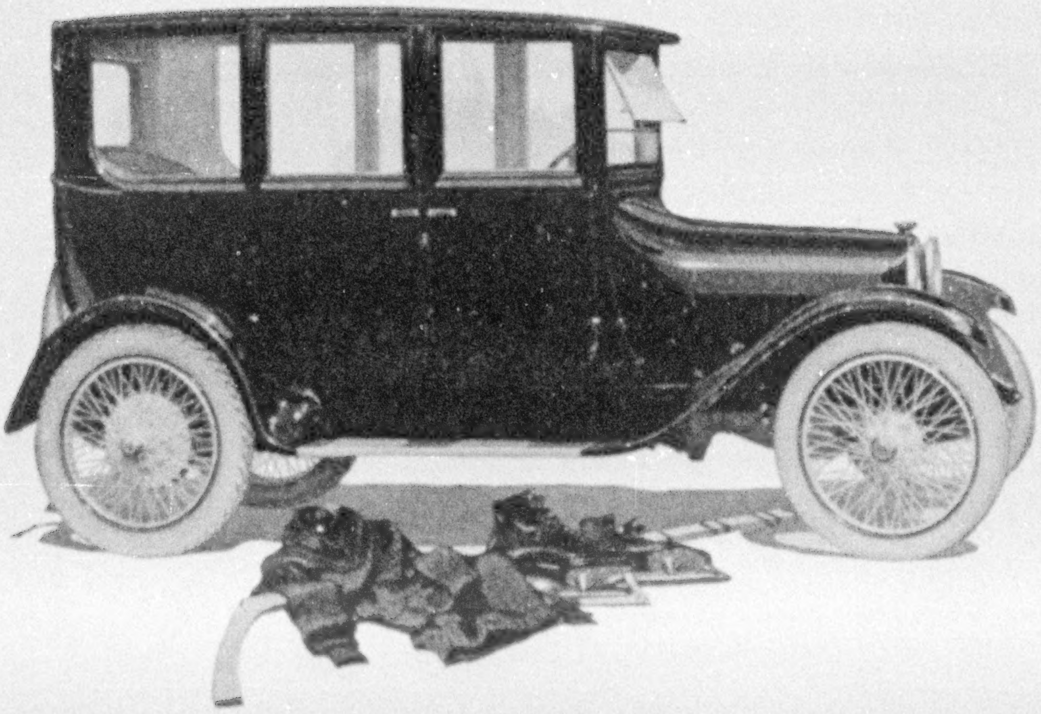

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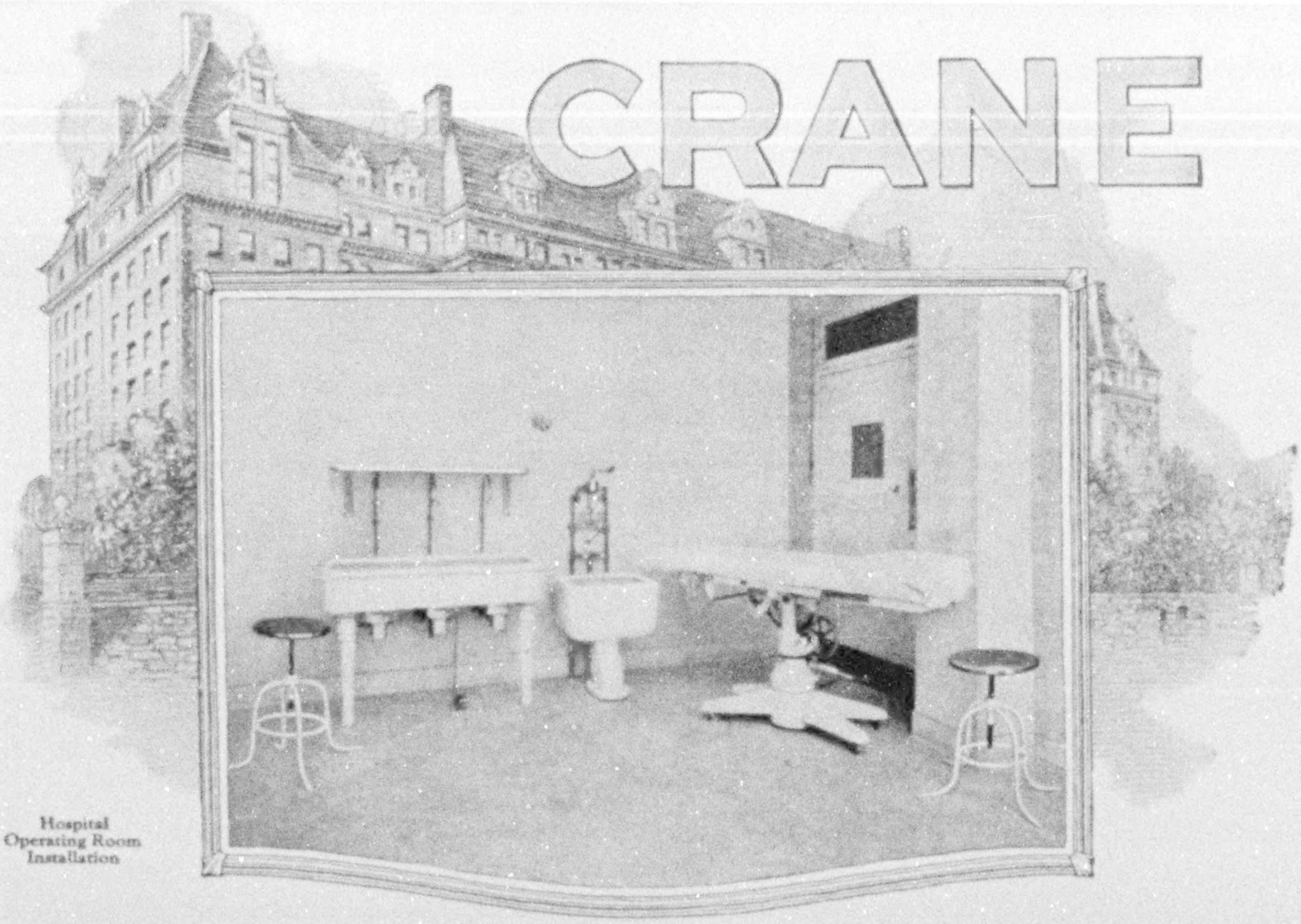

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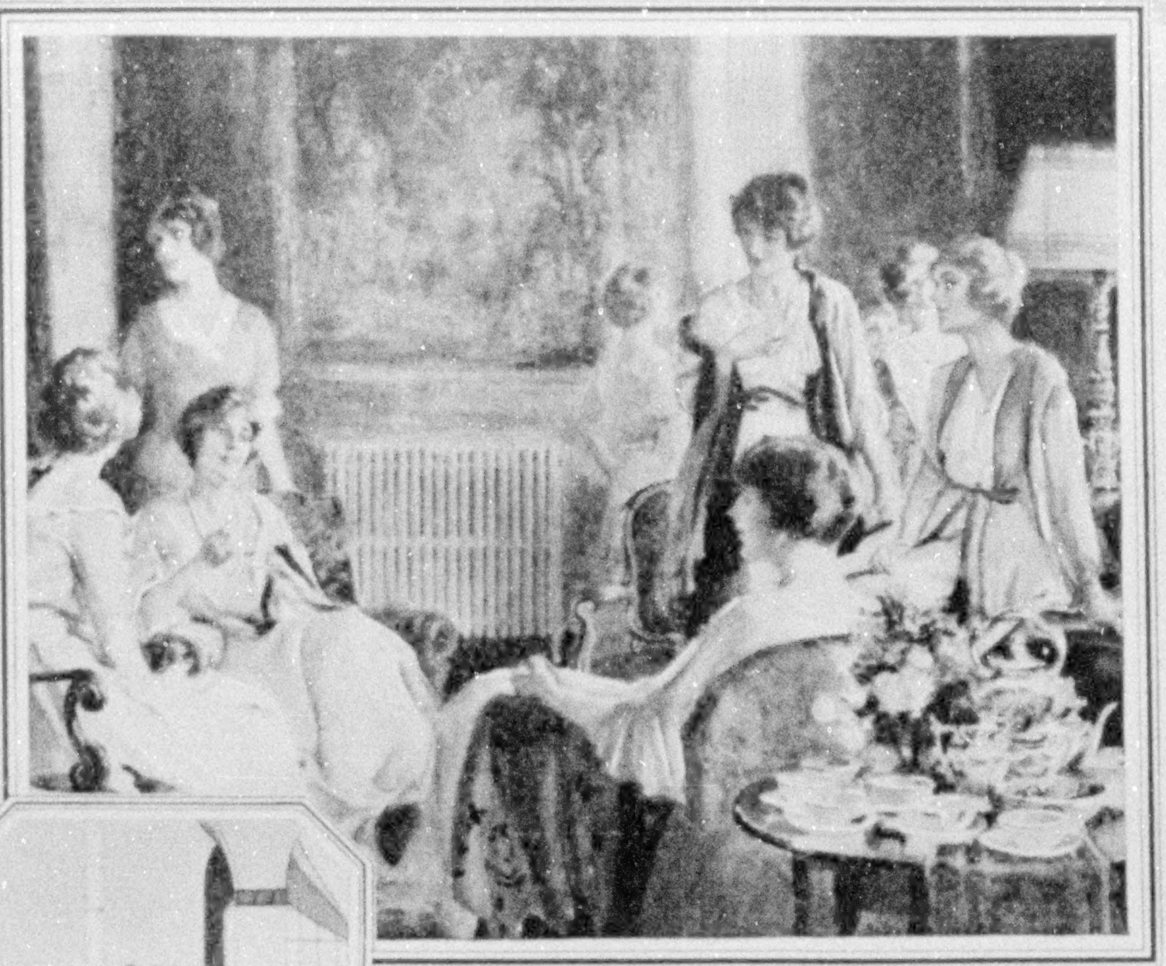

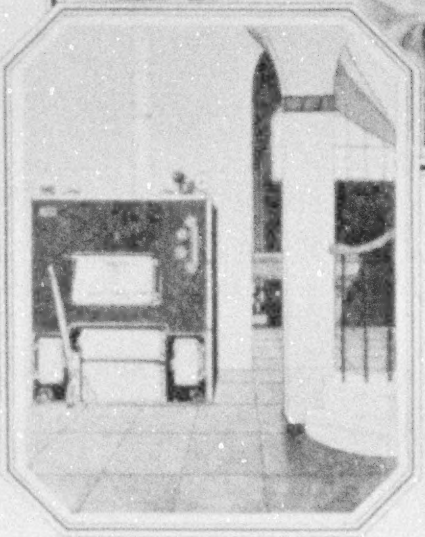

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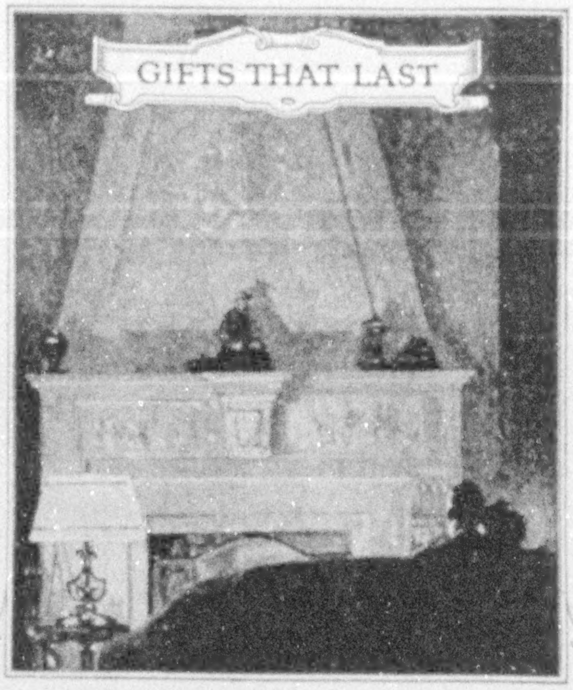

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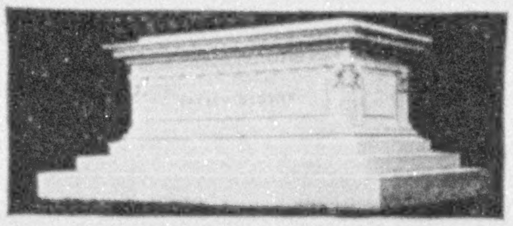

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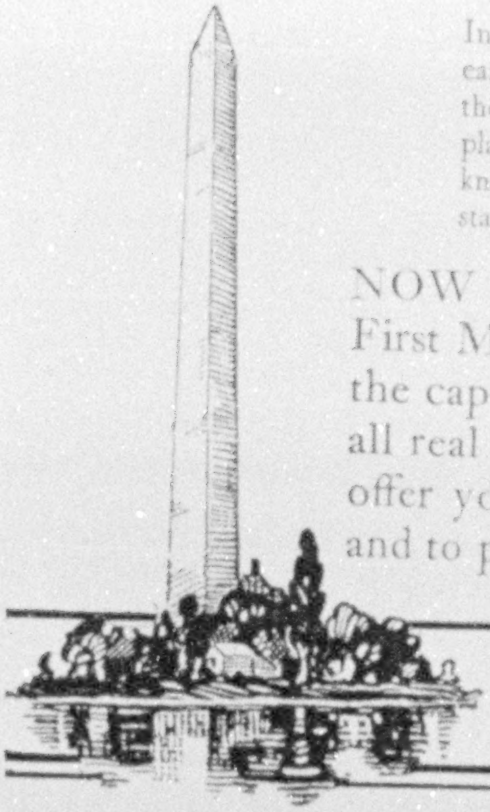

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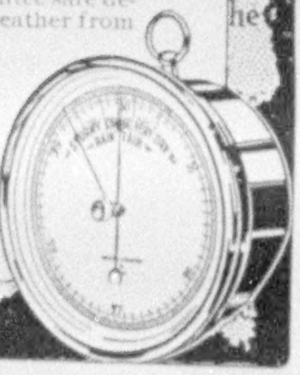

WEATHER

FAIR AND WARMER TO-DAY, TO-MORROW FAIR, MODERATE SOUTH WINDS.

Full Report on Page 12

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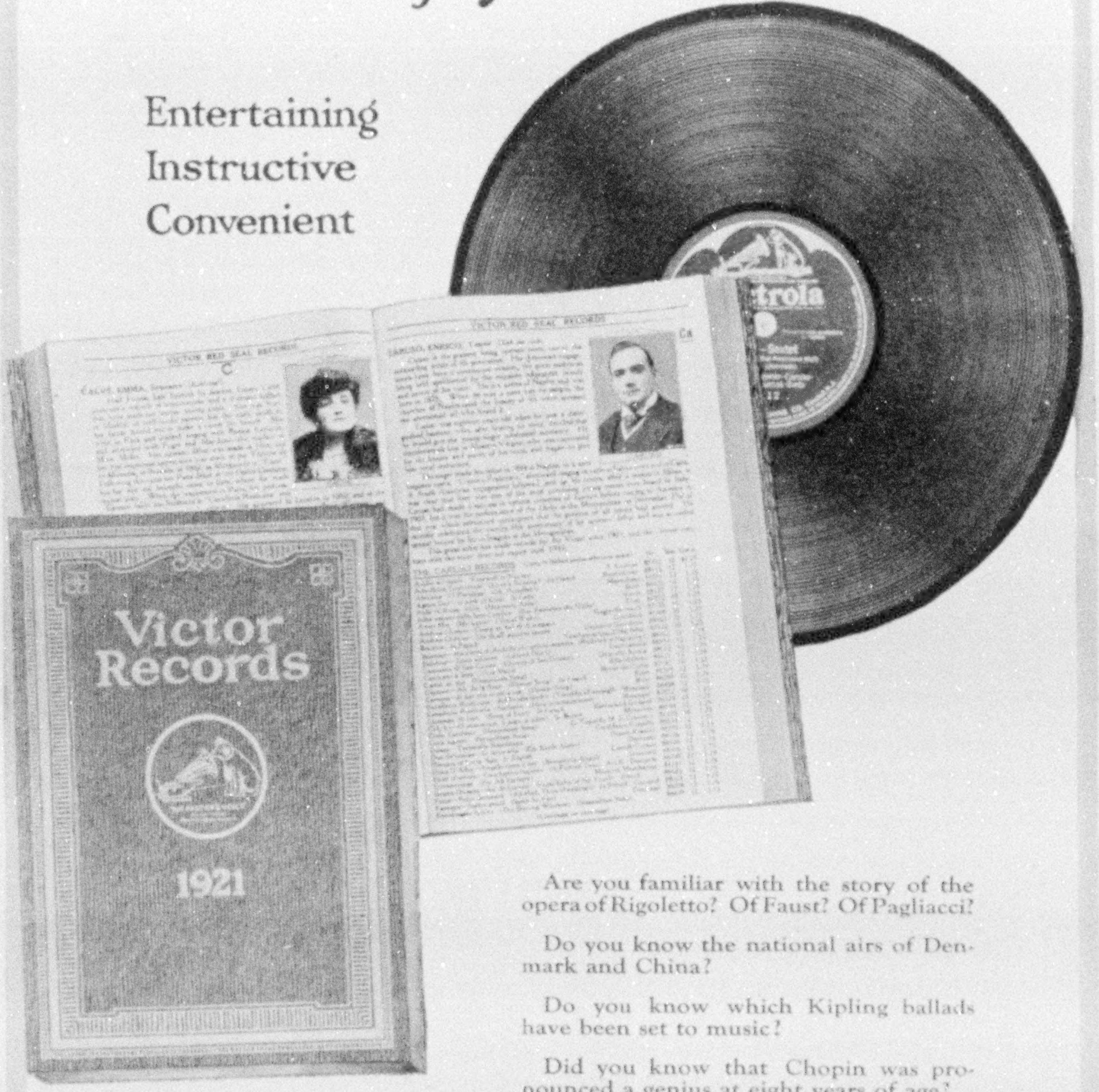

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THE DREAM SHIP

The Story of a Voyage of Adventure More Than Half Around the World in a 47-foot Lifeboat

BY RALPH STOCK

WE ALL have our dreams. Without them we should be clods. It is in our dreams that we accomplish the impossible: the rich man dumps his load of responsibility and lives in a log shack on a mountain top, the poor man becomes rich, the stay-at-home travels, the wanderer finds an abiding place.

The difficulty is to turn one's dreams into realities, and as I happen to be enjoying that rare privilege at the present moment, it is too good to keep.

For more years than I like to recall, my dream has been to cruise through the South Sea Islands in my own ship. I can't help it: that has been my dream; and if you had ever been to the South Sea Islands, and love the sea, it would be yours also. They are the sole remaining spots on this earth that are not infested with big-game-shooting expeditions, globe-trotters, or profiteers; where the inhabitants know how to live, and where the unfortunate from distant and turbulent lands can still find interest, enjoyment, and peace.

A DREAM WITH A COMIC-OPERA PLOT

My dream was as impracticable as most. There was a war to be attended to and lived through, if Providence so willed. There was a ship to be bought, fitted out, and provisioned on a bank balance that would fill the modern cat's-meat man with contempt. There were the little matters of cramming into a chronically unmathematical head sufficient knowledge of navigation to steer such a ship across the world when she *was* bought, and of finding a crew that would work her without hope of monetary reward.

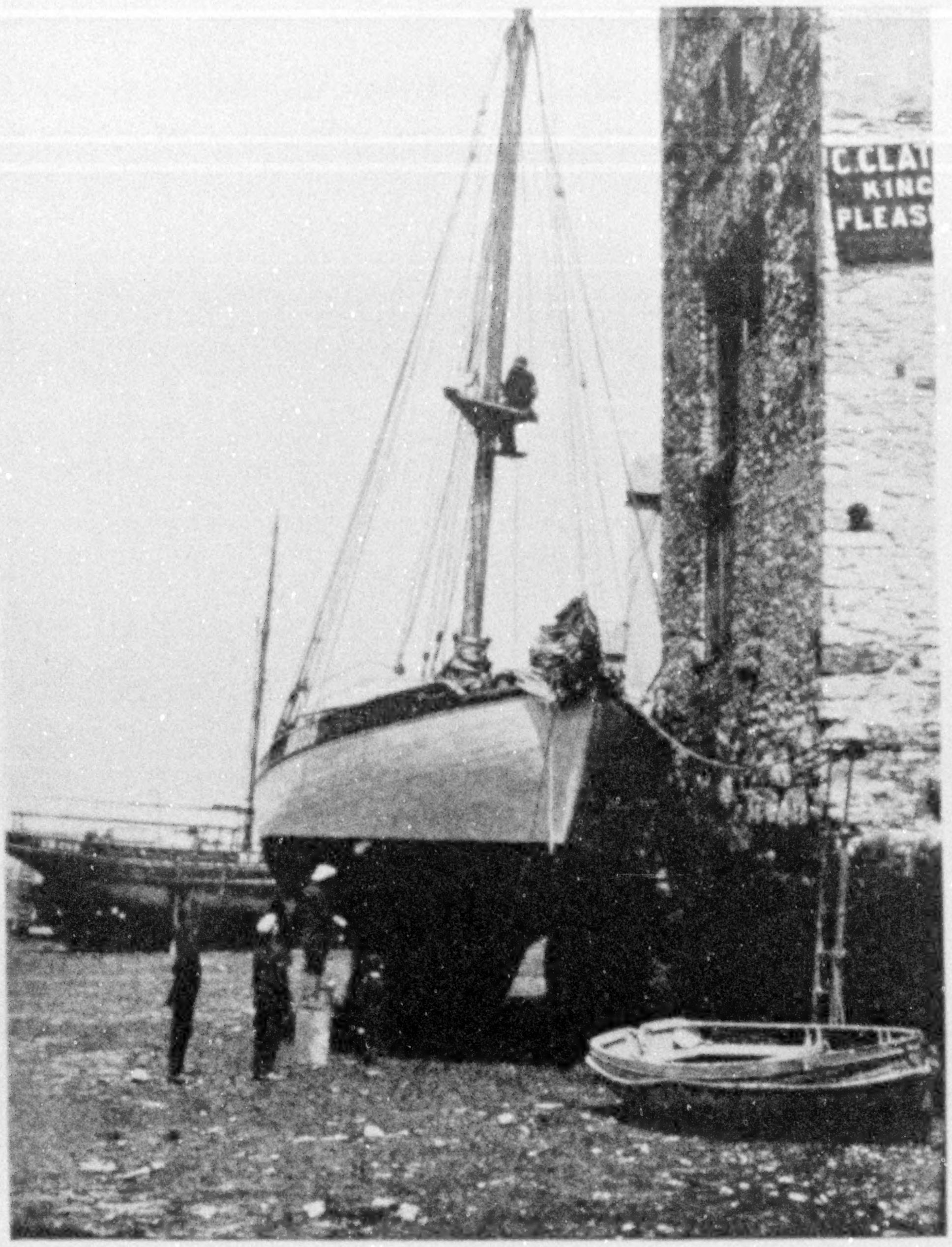
The thing looked and sounded sufficiently like comic opera to deter me from mentioning it to any but a select few, and *they* laughed. Yet such is the driving power of a dream, if its fulfillment is really desired, that I write this on the deck of my dream ship, anchored off the Isthmus of Panama, five thousand miles on the way to my goal.

HOW THE DREAM MATERIALIZED

Exactly how it all came about I find it difficult to recall. I have vague recollections of crouching in dug-outs in France, and while others had recourse during their leisure to letter-cases replete with photographs of fluffy girls, I pored with equal interest over sketches and plans of my dream ship.

In hospital it was the same, and when a medical board politely ushered me into the street, a free man, it took me rather less than four hours to reach the nearest seaport and commence a search that covered the next six months.

It is no easy matter to find the counterpart of a dream ship, but in the end I



Photograph by Ralph Stock

FITTING OUT THE "DREAM SHIP" FOR ITS TRIP HALF AROUND THE WORLD

This staunch little 23-ton vessel, 47 feet in length and with a beam of 15 feet, was a Norwegian-built craft, designed as a lifeboat for service with the North Sea fishing fleet. It was equipped with an auxiliary engine, with which the skipper had trials which only he can describe (see pages 14 and 15).

found her—a Norwegian-built auxiliary cutter of twenty-three tons register, designed as a lifeboat for the North Sea fishing fleet, forty-seven feet over all, fifteen feet beam, eight feet draft.

Such was my dream ship in cold print. In reality, and seen through her owner's eyes, she was, naturally, the most wonderful thing that ever happened. A mother on the subject of her child is almost derogatory compared with an owner concerning his ship, so the reader shall be spared further details.

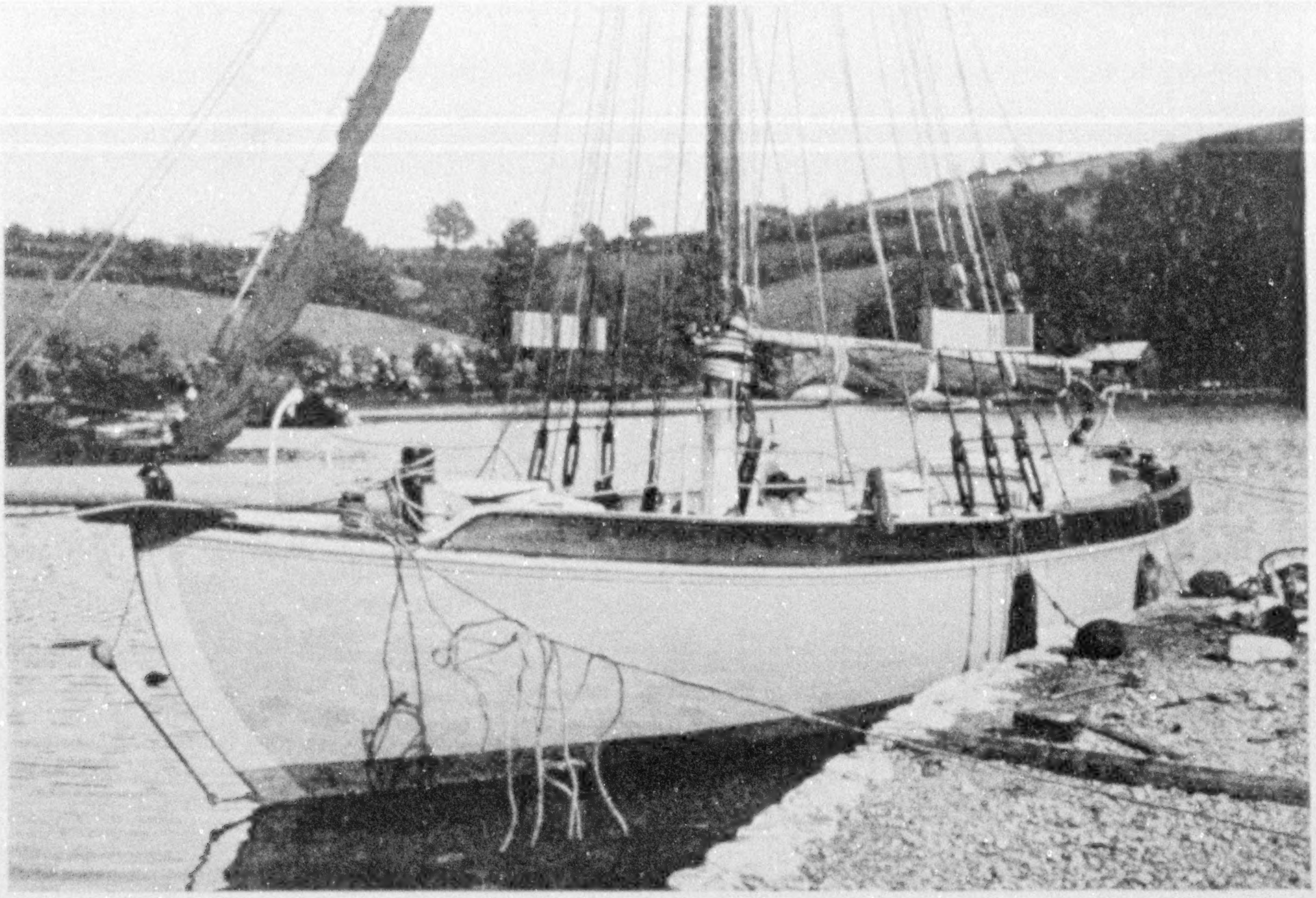
Having found her, there was the little matter of paying for her. I had no money. I have never had any money; but that is a detail that should never be allowed to stand in the way of a really desirable dream. It was necessary to make some. How? By conducting a stubborn offensive on the Army authorities for my war gratuity; by sitting up to all hours in a moth-eaten dressing-gown and a microscopic flat writing short stories; by assiduously cultivating maiden aunts; by coercion; by—but I refuse to say more.

A SISTER OF THE RIGHT VARIETY

The *Dream Ship* became mine. But what of a crew? I have a sister, and a sister is an uncommonly handy thing to have, provided she is of the right variety. Mine happens to be, for she agreed to forego all the delicacies of the season and float with me on a piece of wood to the South Sea Islands. So also did a recently demobilized officer, who, on hearing that these same islands were not less than three thousand miles from the nearest early-morning parade, offered his services with almost unbecoming alacrity.

Behold, then, the crew of the *Dream Ship*—Peter, Steve, and myself—and try not to laugh when I tell you that we learnt what we could of navigation inside of three weeks. On the first of July, 1919, we sailed from Devonshire, England, with a combined capital of £100 and a "clearance" for Brisbane, Australia.

We sailed, and have been sailing ever since, first across the dreaded Bay of



Photograph by Ralph Stock

THE "DREAM SHIP," WITH THE DEVONSHIRE HILLS OF ENGLAND IN THE BACKGROUND, READY TO START ON HER LONG VOYAGE TO THE SOUTH SEAS

Biscay, which treated us with the utmost kindness until off Finisterre, and then drove us before half a gale into Vigo, Spain.

Here we duly admired the soft-eyed senora and her charming children at play on the palm-bordered *alameda,* commiserated with the unfortunate Spanish mule, laid in ten gallons of *vino tinto,* and shaped a course for Las Palmas, Canary Islands.

THE ORDEAL OF COOKING IN A GIRATING FO'CASTLE

Four hours on and eight off was how we apportioned our watches, and, thanks to fair winds and the easy handling of the *Dream Ship,* it was never necessary for more than one of us to be on deck at a time. In fact, there were hours on end when the helmsman could lash the tiller and take a constitutional.

Cooking, a dreaded ordeal, we took week and week about. It is one thing to concoct food in a porcelain-fitted kitchen on *terra firma* and quite another to do it over a Primus stove in a leaping, gyrating fo'castle nine by five. Porridge has been found adhering to the ceiling after "Steve's week." But hush! perhaps he may have something to say on the subject of Peter and myself.

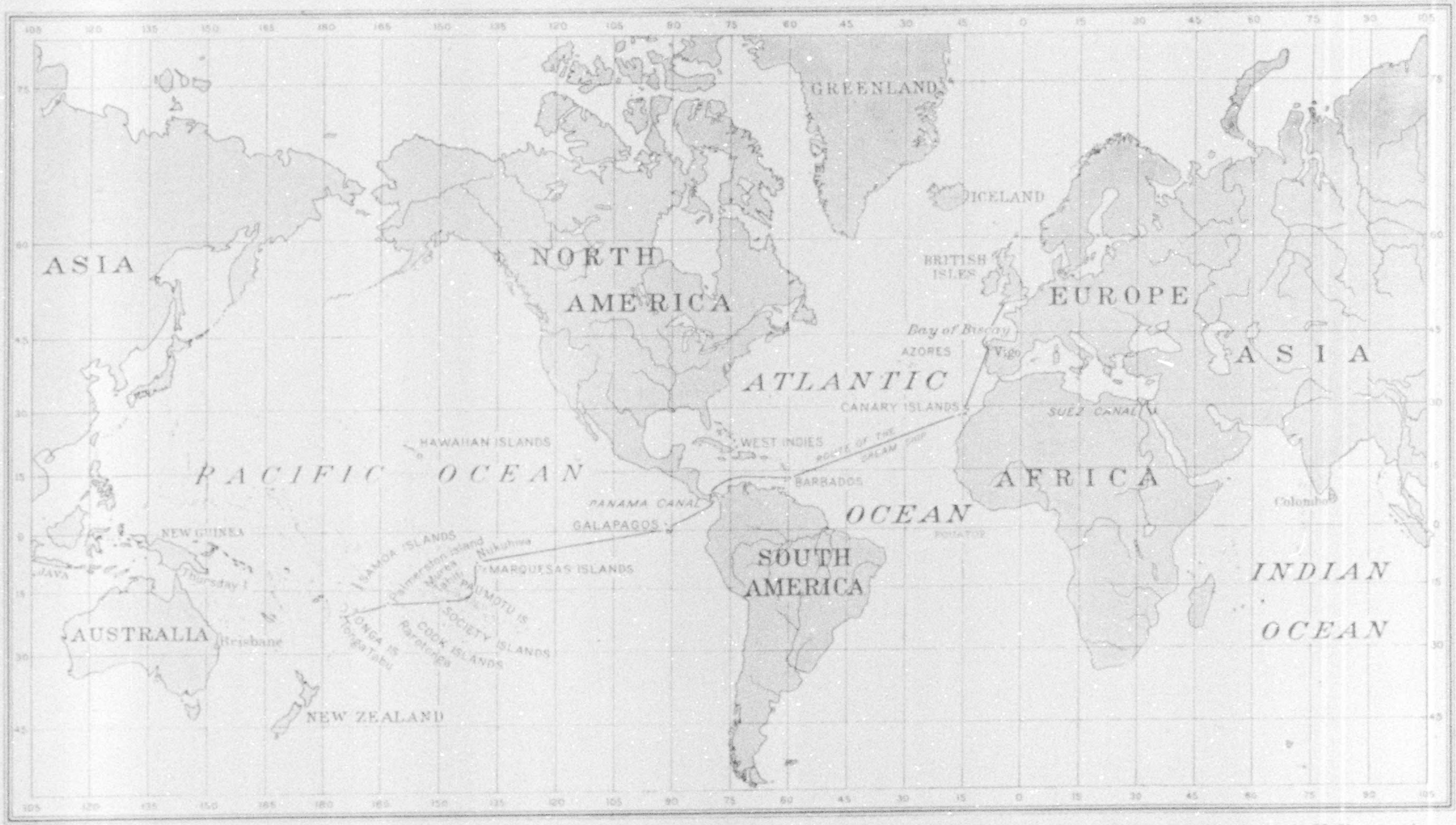
There is always plenty to say about the other fellow, but in nine cases out of ten it is best left unsaid. Forbearance is as much the keynote of good-fellowship on a dream ship as elsewhere—perhaps more—and we are rather proud of the fact that we have covered half the world without battle, murder, or sudden death.

AMATEUR NAVIGATION CALCULATIONS PROVE CORRECT

At the end of ten days' pleasant routine and fair winds, we experienced the acute joy of finding land precisely where our frenzied calculations had placed it.

As the island of Grand Canary loomed ahead, Steve was seen to pace the deck with a quiet but new-born dignity—until hailed below to help wash dishes.

At Las Palmas we suffered a siege of bumboat-men, lost a good deal more than we could afford at roulette, laid in a fresh


GREENLAND
ICELAND
BRITISH ISLES
EUROPE
ASIA
NORTH AMERICA
Bay of Biscay
Vigo
AZORES
ATLANTIC
CANARY ISLANDS
SUEZ CANAL
WEST INDIES
ROUTE OF THE DREAM SHIP
BARBADOS
AFRICA
Colombo
HAWAIIAN ISLANDS
PACIFIC OCEAN
PANAMA CANAL
GALAPAGOS
OCEAN
NEW GUINEA
SAMOA ISLANDS
Palmerston Island
Nukuhiva
MARQUESAS ISLANDS
Java
Thursday I.
Moorea
Tahiti
PAUMOTU IS
SOUTH AMERICA
INDIAN OCEAN
AUSTRALIA
Brisbane
TONGA IS
Tonga Tabu
Rarotonga
COOK ISLANDS
SOCIETY ISLANDS
NEW ZEALAND

Drawn by A. H. Bumstead

THE ROUTE OF THE "DREAM SHIP"

Embarking in a tiny sailing vessel on the coast of Devonshire, England, the adventure-seeking three—Peter, Steve, and the author—made a voyage more than half around the world. In the fulfillment of their dream, the trio called at Vigo, Spain, dropped anchor for a few days in the Canaries, sailed smoothly across the Atlantic to Barbados, then experienced a series of thrills in passing through the Panama Canal. The first objective after entering the Pacific was San Cristobal Island, in the Galapagos Archipelago, off the coast of Ecuador. The Marquesas Group, the Society Islands, Rarotonga, Palmerston, and Tonga Tabu were visited and enjoyed in turn. After purchasing the *Dream Ship*, the combined capital of the voyageurs was only 100 pounds—less than $400 at the current rate of exchange.

supply of *vino tinto*, and set sail for the West Indies.

THE GREAT ADVENTURE REALLY BEGINS

The great adventure had now begun in earnest.

Three thousand miles of Atlantic Ocean lay ahead of us—a waste of waters holding we knew not what of new experience. For the first time since setting sail, our undertaking imbued us with a certain amount of awe.

At night, alone at the tiller, one began to think: Would the drinking water hold out? What if the chronometer broke down? Supposing— It was necessary to think of other things, but what?

Staring into the lighted binnacle, with its swaying compass card, or down at the phosphorescent water, swirling and hissing past the ship's stern, the helmsman became as one hypnotized. It seemed that he was not of this world, but an atom hurtling through space. The temptation was to surrender himself to the sensuous joy of it—a temptation only resisted by an almost painful effort and a knowledge that the lives of all aboard depend on his keeping his leaden eyelids from closing down.

A four hours' watch is too long. They do not allow it in the mercantile marine. But what were we to do? We kept a marlinspike handy, and when oblivion threatened we used it; that was all.

It will be seen that a dream ship is not all dream. If it were, such is the perversity of human nature, the dreamer would probably be tired of it inside of a month.

"I can promise you the northeast 'trades' the whole way across," said the skipper of a fine, six-masted schooner at Las Palmas, turning the pages of his log, and that may account for the fact that not for one day of the Atlantic passage did we encounter a northeast wind. We could have crossed in an open boat, for all of the weather, and three becalmed days in mid-ocean we occupied in swimming around the ship or diving down to scrape the barnacles off her copper.

Yet we made Barbados, West Indies, in thirty days, and gladly surrendered ourselves to the tender mercies of the most charming, hospitable people one could wish to meet.

My recollections of our two weeks' sojourn are a trifle vague, owing to the rapidity with which one pleasure succeeded another. I remember lying at anchor, with awnings up, in the most beautiful bay it is possible to conceive, and sleeping twenty-four hours on end.

From then onward life consisted in "swizzles," car rides over a fairy island, and more "swizzles," pony races to the accompaniment of "swizzles," surf bathing followed by "swizzles," and evenings at the Savannah Club, where conversation was punctuated and sometimes drowned by the concoction of yet more "swizzles" by a hard-worked army of colored folk behind a gleaming mahogany bar.

There is no escaping the "swizzle" in Barbados, even if one wished to, which personally I did not. They are a delightful, healthful drink composed of the very best rum, Angostura bitters, syrup, fresh lime, nutmeg, and ice, the whole swizzled to the creamy consistency of— But I forget that I am addressing a country in the throes of total abstinence, and, whatever my faults, I have never been accused of making a man's mouth water without supplying the deficiency.

Hot-foot from a ball at one of the hotels, we literally fled aboard ship and sailed by stealth, otherwise I am convinced that we should be at Barbados still, imbibing "sw—."

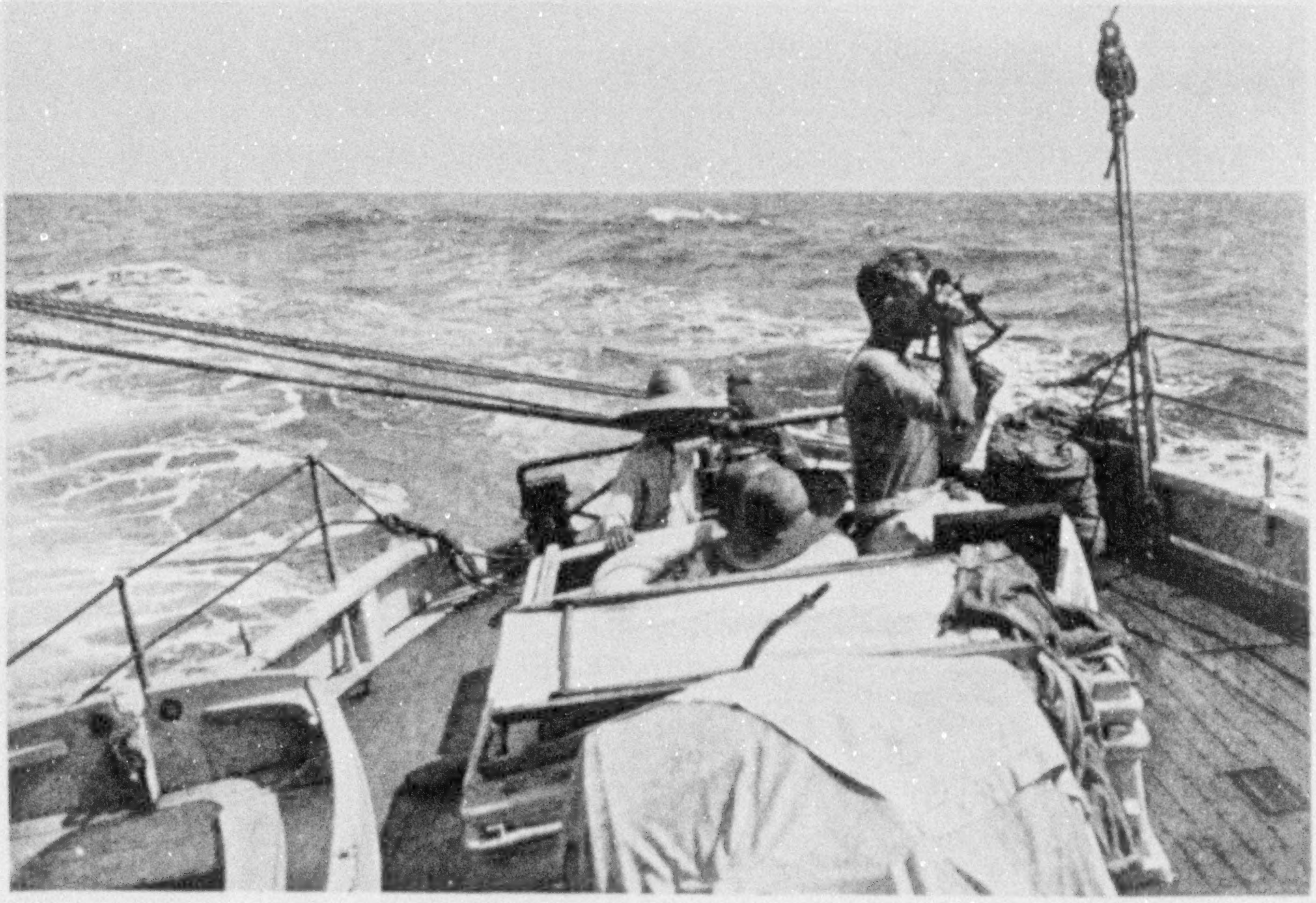
UNDAUNTED BY WEATHER PROPHETS

"Look out for the Caribbean Sea toward December," was another axiom of our six-masted-schooner friend at Las Palmas; but he proved no less fallible over the passage from Barbados to Colon than he had concerning the Atlantic. In fact, I am thinking of, in the future, asking advice of weather prophets and expecting the reverse.

A spanking, following wind, with mainsail and squaresail set, brought us within sight of land in seven days, a distance of twelve hundred miles. But what land? For a time we were at a loss. Comparing it with the chart and descriptions in "sailing directions" revealed nothing.

It was a low-lying, mist-enshrouded, sinister-looking land, and we sailed along its coast for a day and a night before we could tell whether we had passed Colon or hit the coast to the eastward.

STEVE WRESTLES WITH NAVIGATION: THEORY



Photographs by Ralph Stock

STEVE WRESTLES WITH NAVIGATION: PRACTICE

All the knowledge of the intricate problems of navigation possessed by the master and crew of the *Dream Ship* was acquired in three weeks of intensive study before weighing anchor off the Devonshire coast for the 12,000-mile voyage over trackless seas.

Photograph by J. Perestrello

WHEN THE "DREAM SHIP" DROPPED THE PALMS OF THE CANARIES BELOW THE HORIZON, THE VOYAGE TO THE SOUTH SEAS HAD BEGUN IN EARNEST

Ultimately, a light-house gave us the clue, and we found that, owing to a current that has the unpleasant knack of running at anything from a half to three knots an hour, we were still fifty miles from our objective; so we headed for sea and hove-to until daylight.

TERRIFYING REFLECTIONS OFF THE PANAMA CANAL

All night, as we lay rolling in a heavy swell, steamers passed us by, floating palaces of light, and with the dawn we joined the procession of giants making for the Panama Canal.

"We wished to go through the canal? Very well; a measurer would be sent off to determine our tonnage, and we must be ready to take the pilot aboard at five o'clock the next morning."

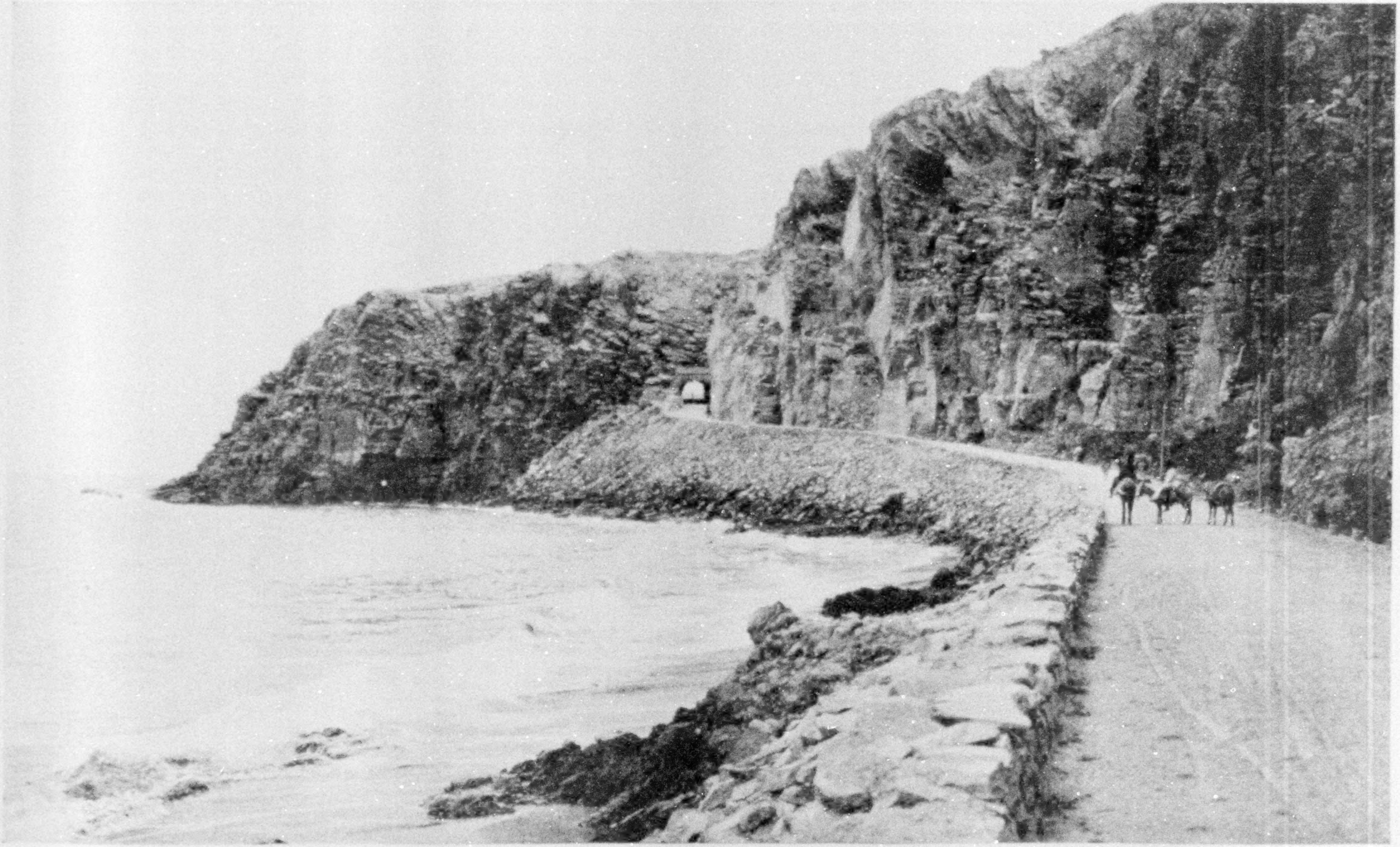
That, in effect, is what the Canal authorities said, and I answered it with a smile that I trust was sufficiently engaging to hide the fact that I was not at all sure we had enough money among us to pay the tolls.

It must be an expensive business, this passing from Atlantic to Pacific; I had never thought of that. There was quite a lot I had not thought about. What if

Photograph by J. Perestrello

DRY GORGE, LAS PALMAS, CANARY ISLANDS

The Canary Archipelago was the first scheduled stop of the *Dream Ship* on its trip to the South Seas. The amateur navigators had been driven into Vigo, Spain, however, by heavy weather in the Bay of Biscay. In the Canaries the voyageurs replenished their stock of *vino tinto* and other ship supplies.



Photograph by J. Perestrello

THE FAMOUS FELDE ROAD, LAS PALMAS, CANARY ISLANDS

Although the home of the canary, these islands derive their name from their large dogs rather than their birds. Writing of the expedition of a king of Mauretania before the Christian era, the elder Pliny records that the monarch called the islands "Canaria, from the multitude of dogs (canis) of great size" which roamed here.

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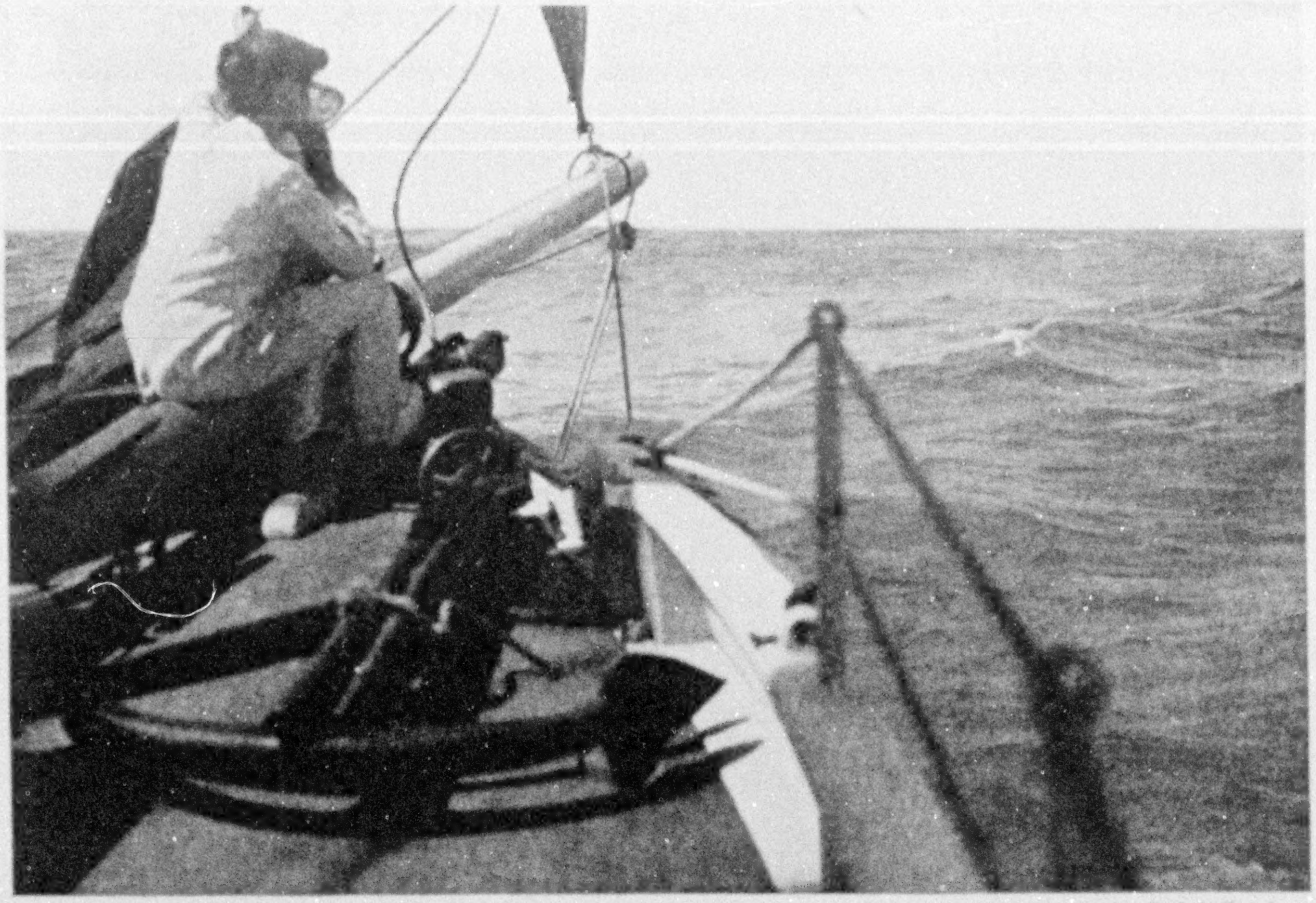

Photograph by Ralph Stock

PAJAMAS CONSTITUTED THE SAILOR'S UNIFORM ON THE "DREAM SHIP"

Peter at the lookout. Leaving the Canaries, 3,000 miles of ocean stretch before her in the direction of Barbados, British West Indies.

the charges were altogether beyond us? It would mean Cape Horn! Cape Horn or the abandonment of the dream!

Which was worse for one who, after sixty below zero on the Canadian prairie, four below zero in France and Belgium, and sometimes far worse in coal-less London, has taken a solemn oath never again to leave the forties of latitude?

These terrifying reflections were cut short by a voice.

"I can't make it more than twelve tons."

"Twelve tons?"

The Canal official deigned to exhibit surprise by a slight elevation of the eyebrows, then smiled.

"The measurer has been aboard," he told me, "and you are twelve tons net. The tolls will be fifteen dollars. Will you pay now or at the other end?"

Such was my relief that I paid on the spot, reducing our united capital to £20, or, at the prevailing rate of exchange, $78.00.

This brief interview with officialdom is typical of Panama Canal methods. Speed, silence, efficiency; nothing else "goes" in "the zone." Things are done in a few seconds and utter silence here that would take hours and pandemonium elsewhere. The entire miracle of passing a ten-thousand-ton liner from Atlantic to Pacific through six locks and forty miles of tortuous, ever-threatening channels has been performed in six and a half hours, and with a lack of fuss that is almost uncanny.

But the *Dream Ship* was twelve tons, and not ten thousand, and for that reason it is probable that she gave more trouble than any craft since the canal was opened. Yet on every hand we received the utmost courtesy and kindness.

Such treatment made us feel like a pestiferous mosquito being politely conducted to the door instead of squashed flat on the spot, as we deserved to be. But you shall see.

STARTING THROUGH THE CANAL

Punctually at 5 o'clock A. M. the pilot came aboard in his immaculate white drill uniform and, without a smile at his sur-

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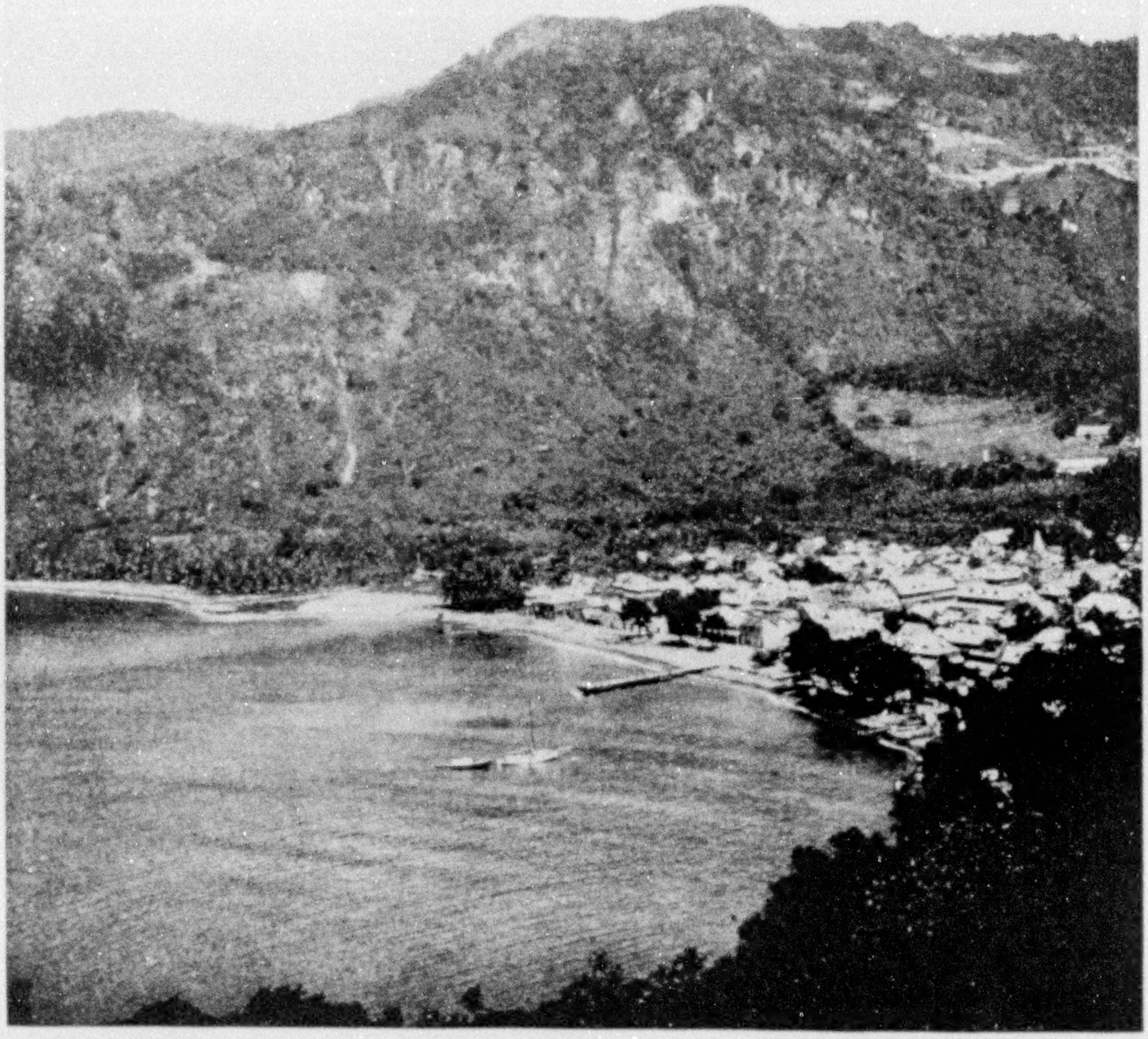


Photograph by Ralph Stock

THE "DREAM SHIP" AT ANCHOR IN A WEST INDIES HARBOR

roundings, including ourselves in variegated costume, took up his position in the bows. I went below, and after a ten minutes' wrestle with the auxiliary engine, contrived to make three out of the four cylinders "go" sufficiently to propel us at a dignified speed of three knots in the direction of the canal.

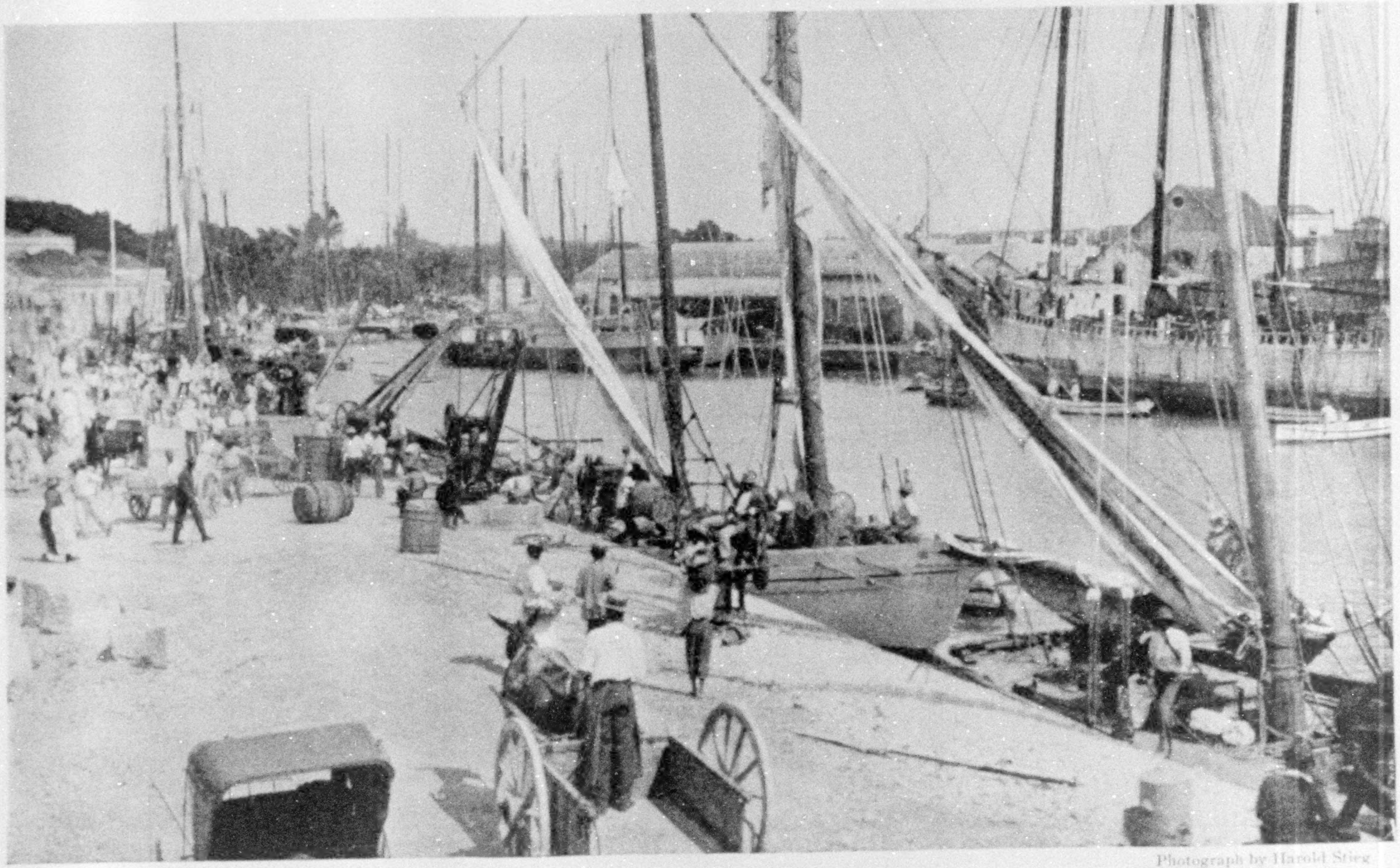
"Is that the best she can do?" inquired the pilot.

I lifted an apologetic, perspiring, and begrimed face to his and admitted that it was; moreover, that we were very lucky to be doing that.

"Ah, well, the day is young," he commented cheerfully. "What about an awning? We shall be baked alive before we've done."

Did I tell him that the reason we had not rigged an awning was that I was more than half expecting the engine to break down, and that we should have to hoist sail? I did not. Whoever heard of sailing through the Panama Canal? An awning was rigged and we entered Gatun Lock in style, followed by two mere liners.

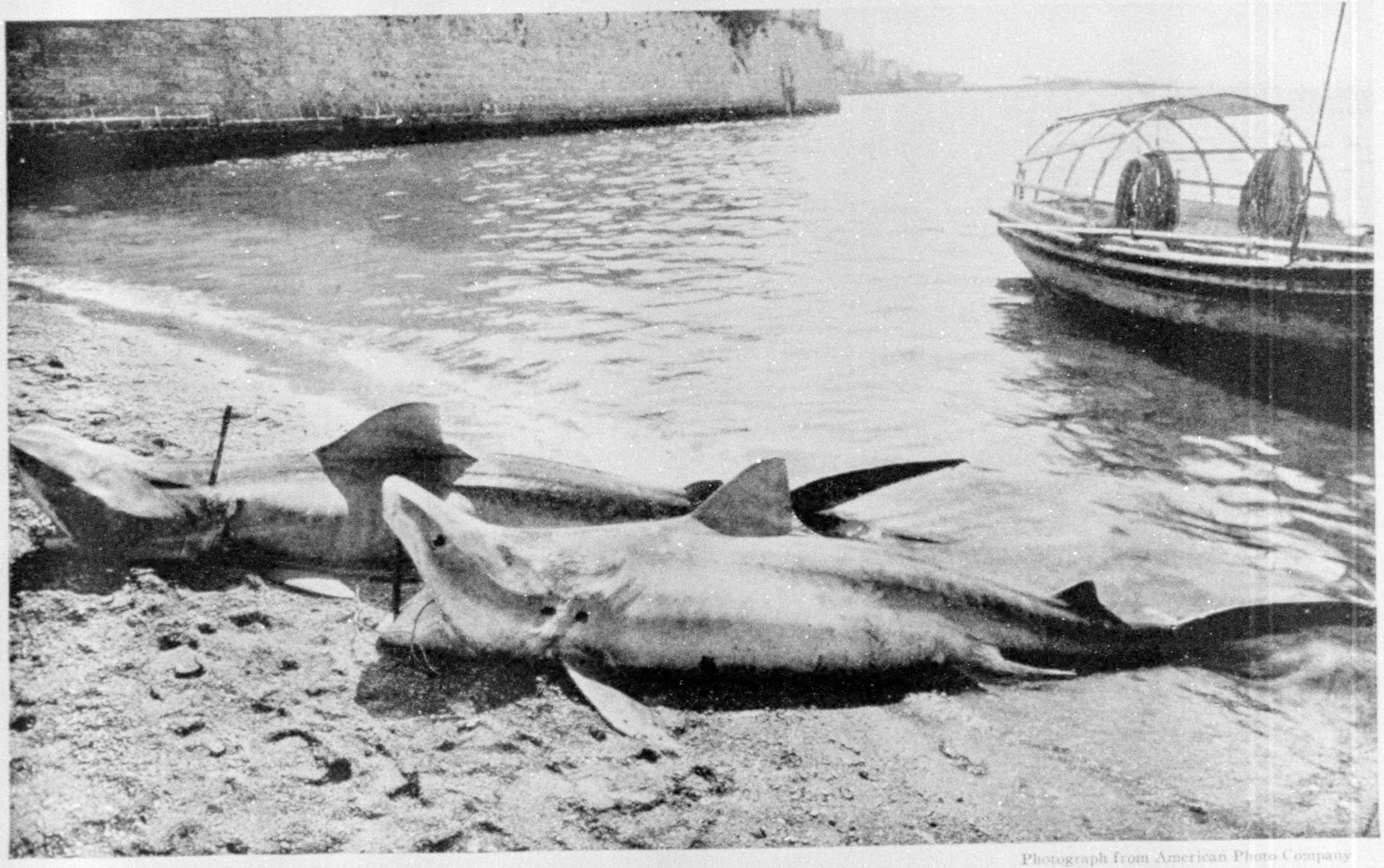
The giant gates closed. There was an eruption of water seemingly under our stern that caused the tiller to fly over



Photograph by Harold Stieg

ON THE WATERFRONT, BRIDGETOWN, BARBADOS

It was a voyage of 30 days for the *Dream Ship* from the Canaries to this, the easternmost of the West Indies.



Photograph from American Photo Company

SHARKS OF THE CARIBBEAN STRANDED ON THE BEACH OF ONE OF THE ANTILLES: WEST INDIES

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Photograph by Harold Stieg

DIVING FOR COINS IN THE CLEAR TROPICAL WATERS AT BARBADOS

At a later period in their wanderings, the voyageurs on the *Dream Ship* were to have an opportunity of comparing this child's play with the activities of the pearl divers of the South Pacific.

and extract a groan of agony from Steve as it crushed him against the cock-pit wall; the aft warp snapped, and the *Dream Ship* commenced to rise, tearing her covering board to ribbons against the lock wall in the process.

There was nothing to be done. Our ascent was as inevitable as the sun's. We rose, and continued to rise, more like an elevator than a ship in a lock, until the blank, greasy wall ended, and above it appeared a row of grinning faces.

"That's that," said the pilot; and it was.

By some miracle the engine carried us to the next lock, where the same performance was gone through, with such slight variations as the loss of a hat, three fenders, and the remainder of the port covering board.

We passed out into Gatun Lake, a fairy place of verdure-clad islets and mist-enshrouded reaches, where cranes flew low over the water, and strange, wild cries came out of the bush.

It was also the place where our engine refused its office peremptorily, irrevocably.

THE DREAM SHIP'S ENGINEER SPEAKS FEELINGLY

I am engineer of the *Dream Ship*, probably the worst on earth, but still the engineer, and for an agonized hour I wrestled with lifeless scrap-iron. How the profession of marine motor engineering ever attracts adherents, it is beyond me to imagine. I know one man it has sent to the asylum, and many others who bear the marks of having trifled with it—finger nails that nothing short of cutting to the quick and gouging with a shovel will render clean; hands, clothes, and, for some unknown reason, face ingrained with ineradicable grime, a permanently furrowed brow, and a wistful expression that goes to the heart of the onlooker.

In order to avoid such a fate, I have made it a practice to try hard for one solid hour and, failing to gain a response from the atrocity, leave the matter in other, and perhaps more capable, hands.

XUM

I communicated this information to the pilot, and then and there the man's more human side came to the surface. It was raining as it knows how to rain on the Isthmus, and he was soaked to the hide; his natty uniform resembled nothing more closely than a dish rag; yet he smiled and proceeded to remove his jacket.

"Guess we'd better sail," he said.

Behold once more the *Dream Ship* sailing through the Panama Canal—alternately scudding before rain squalls, lying becalmed, and making tacks of fifty yards and less—a passage surely unique in the annals of "the zone."

The pilot said he enjoyed it, and by the way he swigged on halyards and gave us an old-time chanty to work by, I am inclined to believe him. We were lucky in our pilot.

Toward evening, and during a stark calm, Steve dived overboard and made us fast to a light-buoy, his jaw dropping perhaps half an inch and a thoughtful expression coming into his eyes when a little later a log on the muddy shore was suddenly imbued with life and slipped into the water with a whisk of a horny tail.

So it was that we had afternoon tea in comfort, some alleged music on piano and clarinet, and a pleasant chat with the pilot concerning the older and better days of the wind-jammer, while an ungainly pelican swooped and dived and somewhere ten-thousand-ton steamers were being hustled through the Panama Canal.

TAKEN IN TOW

We had no wireless; that was why it was impossible to summon a tug to take us on our way. Finally a monster steamer passed so close that it was possible to hail her, and a few hours later we were taken in tow by an apparition of noiseless engines, shining varnish, and gleaming brass.

It would cost us $6 an hour, the pilot told us, and I sat back to figure out just how long $78 would last under such an onslaught.

The result was alarming. We held a committee meeting about it in the bows and decided that there was nothing for it but to go on, and keep going on until we stopped. We had hoped to reach lands where money was of secondary importance, but we were not there yet; that was evident.

So we continued to race through the canal at the rate of $6 an hour until we reached the approaches to Pedro Miguel lock, where the apparition tied us up and steamed off, still at $6 an hour.

Something happened to us that night at Pedro Miguel. Looking back on it all, I can hardly persuade myself that it is not a dream. We met some canal officials—tall, sun-burned youths, with the mark of efficiency upon them, yet with a merry twinkle in the eye. We asked them aboard, and they came and marveled at what they saw. Their verdict was, as far as I can remember: "Some novelty!"

ENTERTAINMENT ON THE ISTHMUS

Then they asked us ashore, and it was our turn to marvel. One of our hosts was the chief operator of a lock, and we saw the miracle of the Isthmus of Panama from behind.

Futility overwhelms me at thought of trying to describe what we saw that night, over the lock, under the lock, at the sides of the lock; besides, you will find it all reduced to cold figures in technical journals if you are that way inclined.

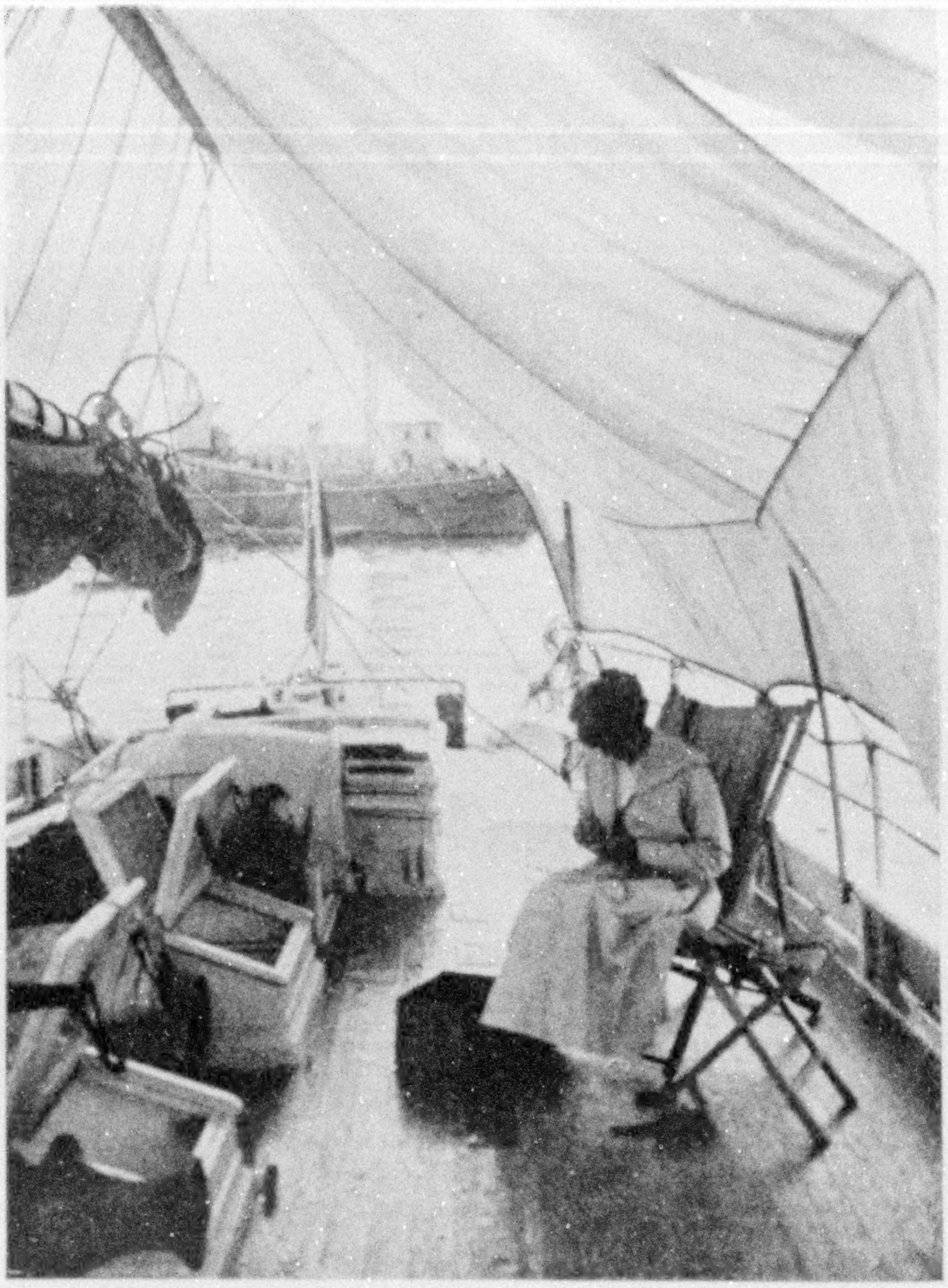
It was the spirit of the thing that took hold of me—a pigmy man sitting at a lever! What was not possible after this?

We returned to the ship almost stupefied. One feels much the same if he attempts to think in Westminster Abbey. We were in the process of turning in when a cheerful head appeared through the skylight.

"We await your pleasure," quoth a voice.

I explained that the owner of the head was no doubt unconsciously violating, but still violating, the sanctity of my sister's bedroom. It made no difference.

I protested that at that moment my sister's costume consisted of a pair of ill-fitting pajamas and a kimona, and that Steve and I had nothing to our backs but what we had worn all day—an undershirt and a pair of football shorts; that we were all tired to death and literally ached for our pillows; that his kindness



Photograph by Ralph Stock

UNDER THE AWNING AT LAS PALMAS, CANARY ISLANDS

Buttons come off, rents occur in clothing, and holes in socks, even aboard a *Dream Ship*. Peter proves as handy with needle and thread as with frying-pan and tiller-rope.

was overwhelming, but that— Nothing made any difference.

Somehow we found ourselves in a car, the chief operator's first car, that he had learnt to drive during the dinner hour the previous day.

Out into the moonlight we sped, or rather zigzagged at the rate of forty miles an hour, while between Peter and myself a youth named Bill—I shall never forget Bill—kept up a running flow of informative rhetoric.

"*On* the left we have the famous Isthmus of Panama, intersected by the still more famous Panama Canal—a miracle of modern engineering, as it has been aptly termed (see leaflets). Fear not, lady" (this is an aside to Peter), "the man at the wheel values his life as much as yours, perhaps more.

"*And now* we approach the historic city of Panama, passing on our left the Union Club, otherwise known as the Onion Club, frequented solely by the nobility and gentry of the neighborhood.

"*And on the right*—"

On the right was the blazing portico of a cabaret, and the car had come to a jarring full stop.

In vain we pleaded our costume, the hour of night, the utter degradation of exposing ourselves to the public gaze in such a condition. We literally *found* ourselves at a table drinking imitation lager beer and grape juice and listening to raucous-voiced, imported ladies rendering washy ballads to the accompaniment of tinkling ice and tobacco smoke.

It all sounds sordid enough, but it was vastly amusing to sea-weary wanderers, and will remain with us a memory of kindness and good-fellowship.

Today we lie at anchor off Balboa, in the Pacific Ocean. We have come far and hope to go a great deal farther. To do so we have come to the conclusion it will be necessary to make some money.

How? Well, we have a ship; a group of pearling islands lies thirty miles to the westward, and—but of this anon.

A strange life, my masters, but one that I would not exchange with any man.

XUM

CHAPTER II

"Tomorrow," said Steve, mate of the *Dream Ship*, "we ought to raise Tower Island."

"Good," said I, with an indifference born of confidence in our navigating officer.

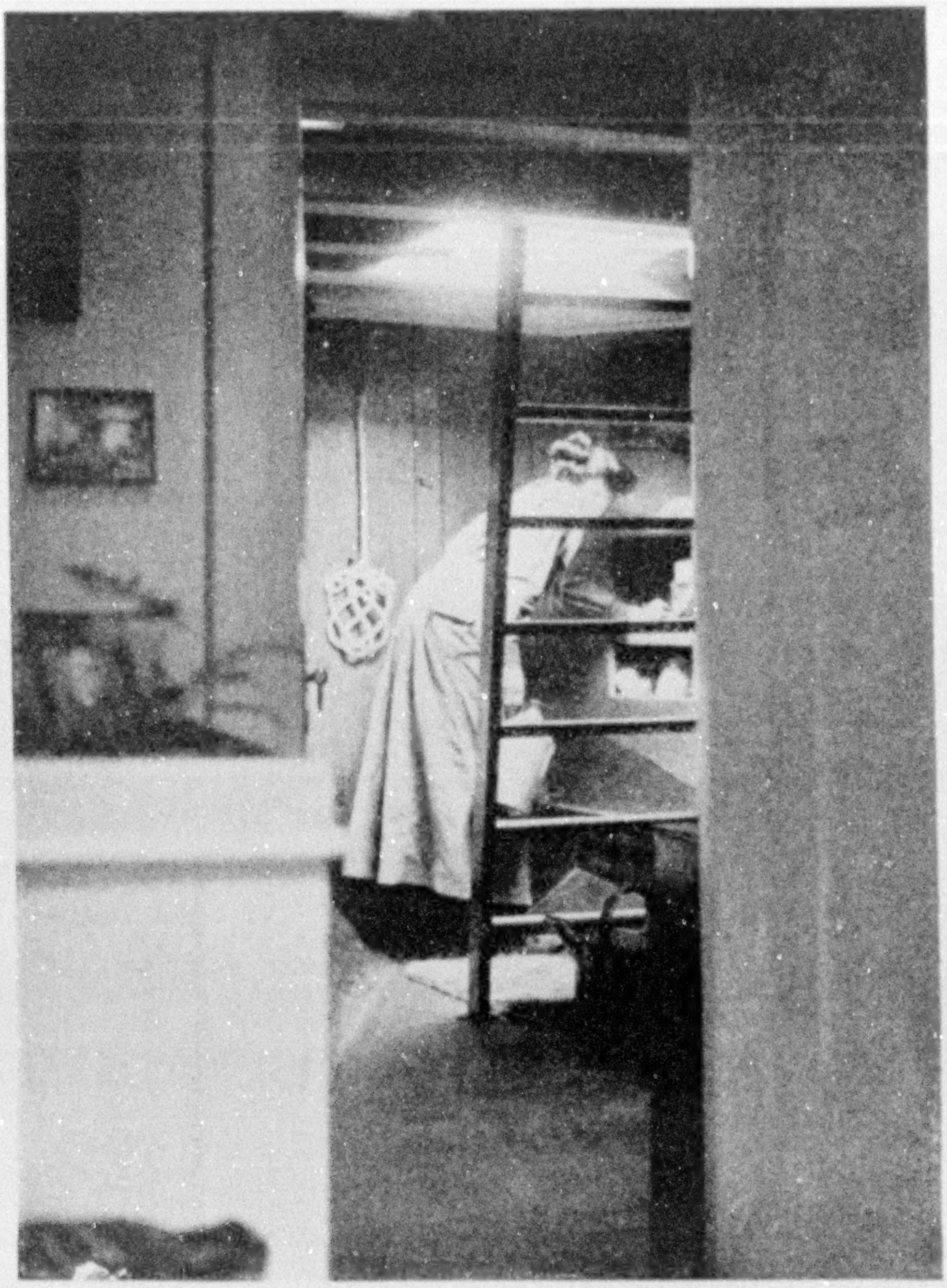
"Splendid!" said Peter, who, owing to a professed and preferred ignorance of navigation, had not ceased to look upon the determination of a ship's position at sea as a species of conjuring trick.

After a seven-thousand-mile sail, we were approaching the ash-heap of the world.

At the time we had no notion that it was an ash-heap, but you shall judge.

Throughout that night we took our appointed four-hour, single-handed watch: slept our four hours, as we had come mechanically so to do during the past four months, and went on deck at dawn to see Tower Island.

It was not there.



Photograph by Ralph Stock

THE COOK'S JOB ON THE "DREAM SHIP".

There was no system of castes on the *Dream Ship*. Master, mate, and "crew" took their turns, one week at a time, over the Primus stove in the tiny nine-by-five fo'castle.

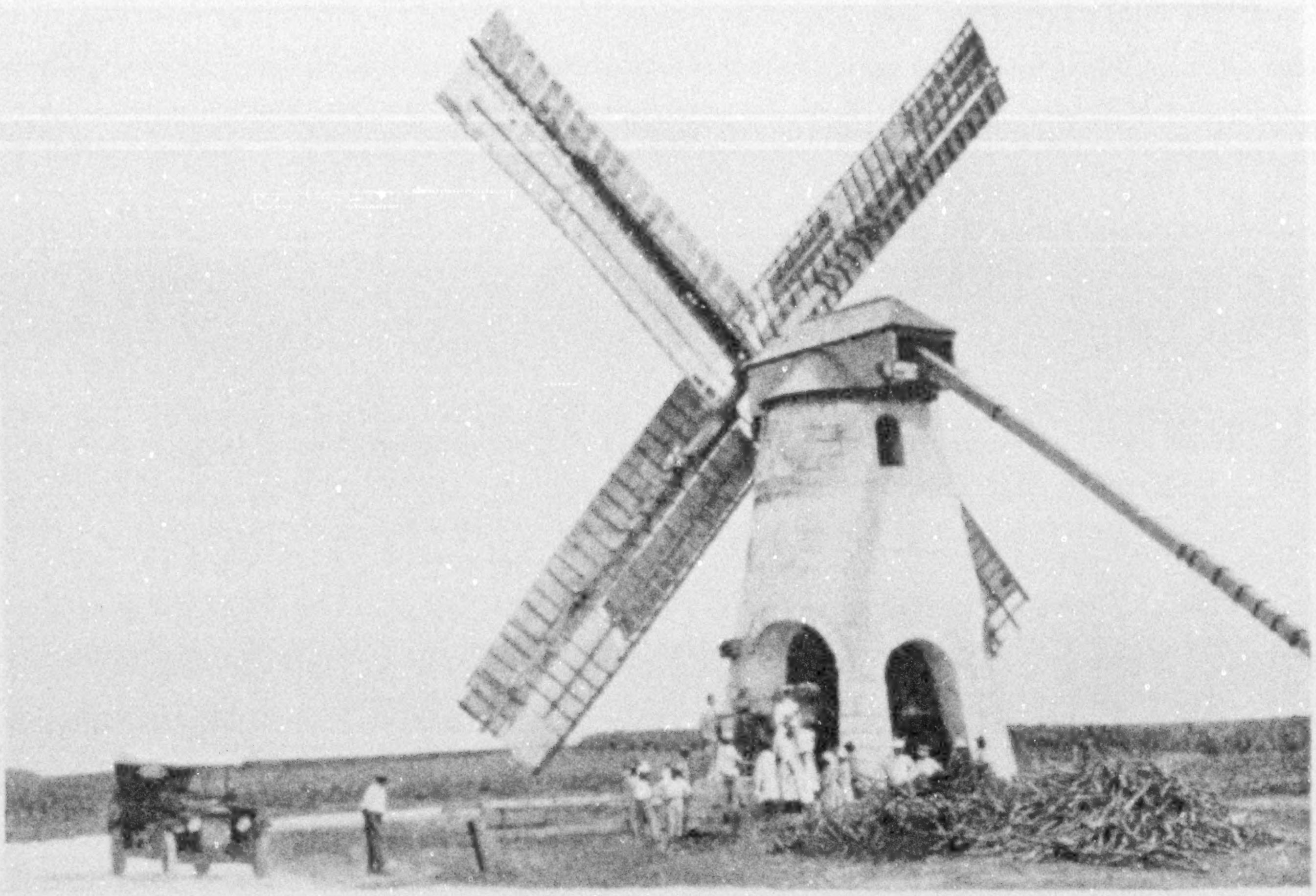
A LOST ISLAND

Steve, who was at the tiller, looked vaguely troubled, but offered no comment; neither did we. "Leave a man to his job" had become our watchword through many vicissitudes. But when night followed day with customary inexorableness, but without producing anything more tangible than the same empty expanse of ocean, Steve was constrained to mutter, a sure preliminary to coherent speech.

"One of three things has happened," he announced; "the chronometer's got the jim-jams, the chart's wrong, or the blinking island has foundered."

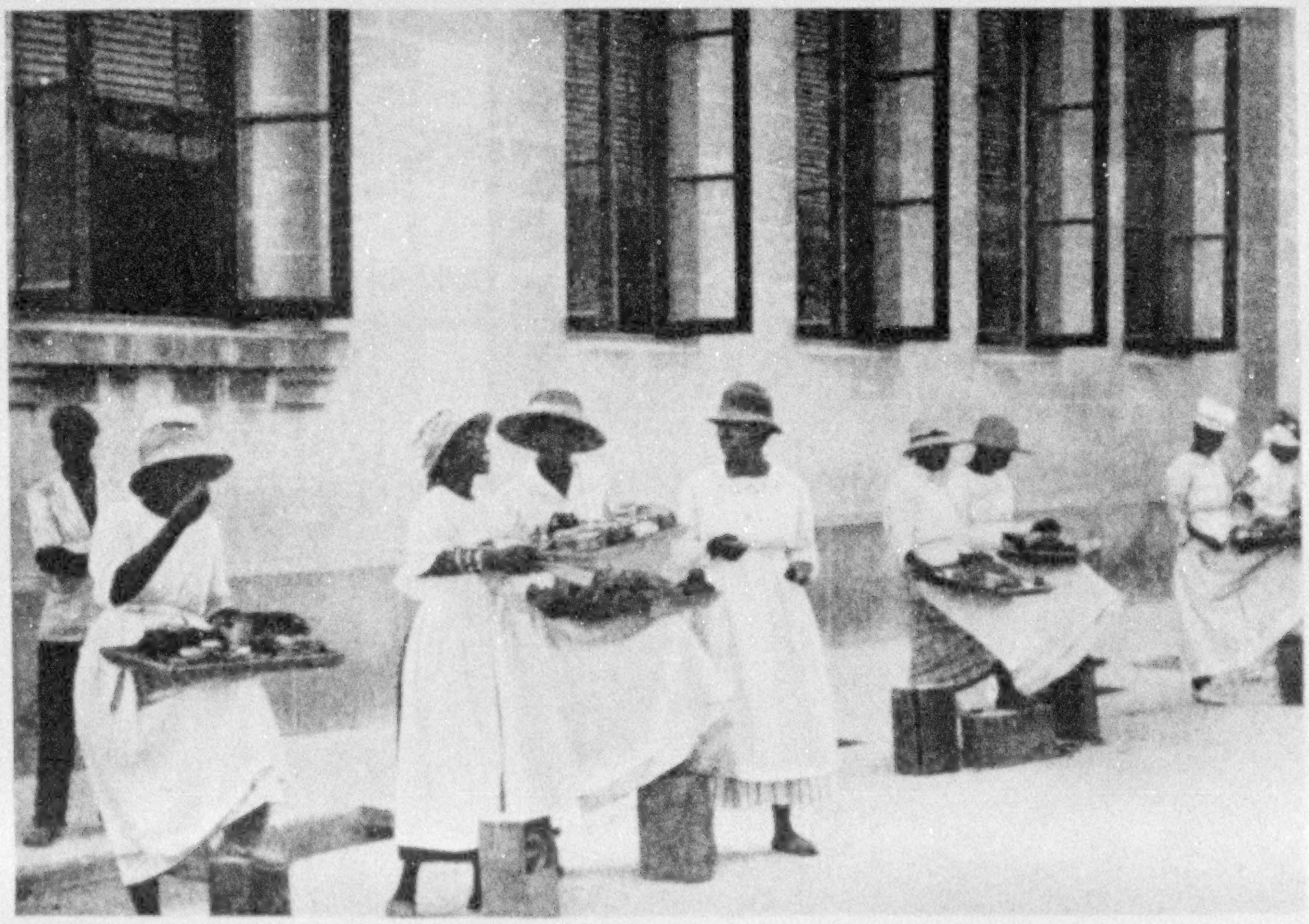
As skipper of the *Dream Ship*, it devolved upon me to verify these surprising statements, which after a superhuman struggle (being probably the worst mathematician on earth) I did.

By our respective observations and subsequent calculations, the ship's position proved identical. According to instruments, we were at that moment plumb in the middle of Tower Island. It was thoughtless of it to have evaporated at the very moment when we so sorely needed it as a landmark. We said so in



AN OLD-FASHIONED CANE MILL IN BARBADOS

One-third of the area of Barbados is planted in sugar-cane, yielding as high as 50,000 tons of sugar and 10,000,000 gallons of molasses annually.



Photographs by J. Harold Stieg

SALES GIRLS IN BRIDGETOWN, BARBADOS: THEIR COUNTERS ARE TRAYS AND THEIR WARES ARE SWEETMEATS

XUM

strong terms. We were still saying something of the sort when a small, high-pitched voice came from aloft:

"Land O!"

Peter, in striped white and green pajamas, was astride the jaws of the gaff. Steve and I exchanged relieved glances and, with a lashed tiller, we all went below for a rum swizzle, the inevitable accompaniment to a landfall. We had reached the Galapagos Islands.

The southeast "trade" was blowing as steadily as a "trade" knows how, and there was nothing between us and San Cristobal (Chatham) Island, the most populous of the group; consequently I slept the sleep of a mind at peace until awakened by a well-known pressure on the arm.

FACING AN UNKNOWN DANGER

"Come and take a look at this," whispered Steve, so as not to wake Peter in the opposite bunk.

"This" proved to be a solid wall of mist, towering over the ship like a precipice. The trade wind had fallen to a stark calm, and the *Dream Ship* lay wallowing on an oily swell. A young moon rode clear overhead, and myriads of stars glared down at us; yet still this ominous gray wall lay fair in our path.

"It ought not to be land," said Steve, "but I don't like the look of it."

Neither did I.

We stood side by side, straining our eyes into the murk. A soft barking, for all the world like that of a very old dog, sounded somewhere to port. Splashes, as of giant bodies striking the water, accompanied by flashes of phosphorescent light, came at intervals from all sides and presently the faint lap of water reached our ears.

"Mother of Mike!" breathed Steve, "we're *alongside* something."

At that moment, and as though impelled by some silent mechanism, the pall of mist lifted, revealing an inky black wall of rock not fifty yards distant!

My frenzied efforts at the flywheel of the motor auxiliary were as futile as I had more than half expected. Who has ever heard of these atrocities answering in an emergency? We had no sweeps. To anchor was a physical impossibility. The lead-line vanished as probably twenty other lead-lines would have vanished after it, in those fathomless waters. So we stood, watching the *Dream Ship* drift to her doom.

"CLAWING OUR WAY ALONG A ROCKY WALL"

What happened during the next hour is as hard to describe as I have no doubt it will be to believe. The Galapagos Islands are threaded with uncertain currents, and one was setting us now onto the rocky face of an islet cut as clean and sheer to the sea as a slice of cheese.

We should have touched but for our fending off. There is no other way of describing our antics than to say that we clawed our way along that rocky wall until, at the end of it, a faint air caught the jib, the foresail, the mainsail, and we stood away without so much as a scratch.

Sunrise that morning was the weirdest I have ever seen. There are over two thousand volcano cones in the Galapagos Islands, and apparently we were in the midst of them. On all hands and at all distances were rugged peaks one hundred to two thousand feet high, rising sheer from a rose-pink sea into a crimson sky.

Sleek-headed seals broke water alongside, peered at us for a space with their fawn-like eyes, barked softly, and were gone. Pelicans soared above our truck and fell like a stone on their prey. Tiny birds, yellow and red, flitted about the deck or flew through the skylights and settled on the cabin fittings with the utmost unconcern.

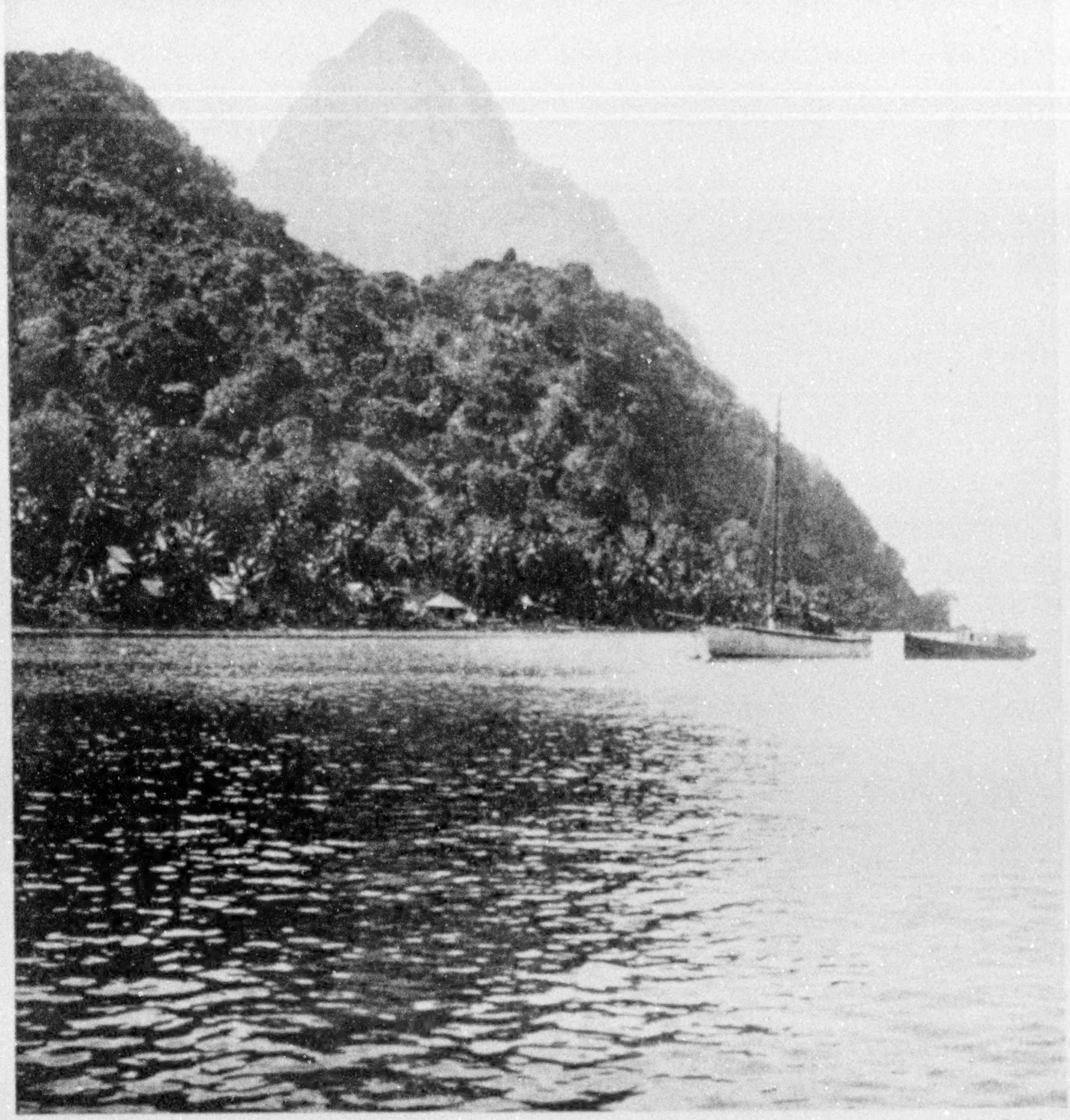
Down in the crystal-clear depths vague shapes hovered constantly—sharks, dolphin, turtle, and ghastly devil-fish.

All life seemed confined to water and air; never was dry land so desolate and sinister as those myriads of volcanic cones. Yet one of them was peopled with human beings. Which? We were lost, if ever a ship was lost, in the labyrinths of an ash-heap.

BECALMED IN THE WATERS OF THE ASH-HEAP

All we knew was that Cristobal was the easternmost of the group. We sailed east, only to be becalmed inside of an hour and to lose by current what we had gained by wind.

XUM



Photograph by Ralph Stock

AT ANCHOR OFF ONE OF THE WEST INDIES

Close to this same group a sailing vessel has been known to have her insurance paid before she reached port. The calms run in belts of varying widths, and unless a ship can be towed or kedged to one side or the other, there is nothing to prevent her remaining in the same spot for six months.

Our water would not last half that time, and there is little on any of the islands except Cristobal.

We began to think. We continued to think for four mortal days, until the fitful southeast "trade" revived, as by a miracle, and we were bowling along at a seven-knot clip. What a relief was the blessed motion of air! We hardly dared breathe lest it should drop.

It held, and we made what we took to be Cristobal. The dinghy was lowered, the ship cleared up for port, and we began to discuss the possibilities of fresh milk, eggs, and bread.

But it was not Cristobal Island. Neither were three others that we visited, all as alike as peas—a chain of ash-heaps, an iron bound coast of volcanic rock, broken here and there by a dazzling, powdered coral beach.

I admit that to the professional seafarer our inability to find Cristobal must appear ridiculous. For his benefit I would point out that we were not professional seafarers, but a party of inconsequent and no doubt over-optimistic land-lubbers engaged in the materialization of a dream—to cruise through the South Sea Islands in our own ship; that what navigation we knew had been learnt in three weeks, and that I would invite any one who fancies his bump of locality to test it in the Galapagos Islands.

LANDING AT CRISTOBAL

We had more than half decided to cut out Cristobal and its five hundred inhabitants and shape a course for the Society Islands, 3,500 miles to the southwest'ard, when Steve gave a yelp like a wounded pup.

"I see Dalrymple Rock," he chanted, as one in a trance, with the binoculars to his eyes. "I see Wreck Point, and a bay between 'em, with houses on the beach. What more do you want?"

How supremely simple it was to recognize each feature by the chart—when there was an unmistakable landmark to go by. What fools we had been not to—

But we left further recriminations till a later date. At the present it was necessary to enter Wreck Bay through a channel three hundred yards wide, without a mark on either side, in the teeth of a snorting "trade," and with a lee tide.

At one time during the series of short tacks that were necessary to get a slant for the anchorage we were not more than fifty yards from the giant, emerald-green rollers breaking on Lido Point to port with the roar of thunder. To starboard one could see the fangs of the coral reef waiting for us to miss stays to rip the bottom out of us.

But the *Dream Ship* did not miss stays, and finally we shot through the channel into Wreck Bay, and anchored in three fathoms of water off a rickety landing stage.

THE OWNER OF CRISTOBAL BOARDS THE DREAM SHIP

While the agony of removing a three-weeks' beard was in progress a crowd had assembled on the beach, and presently a boatload of three put off to us. Steve, who had picked up some Spanish during three misspent years in Mexico, received them at the companion with a new-born elegance that matched their own.

They proved to be the owner of the island, a good-looking youth of about twenty-five; the chief of police (presumably "chief," because there is only one representative of the law in the Galapagos), a swarthy Ecuadorean in a becoming poncho, and a little, wrinkled old man with a finely chiseled face and delicate hands.

The owner of Cristobal informed us in excellent French (he had been four years in Paris previous to marooning himself on his equatorial possession) that the island was ours and the fullness thereof; that he also was ours to command, and would we dine with him that evening at the hacienda, it being New Year's eve?

The "chief" of police demanded our ship's papers, which, when placed in his hands, he gracefully returned without attempting to read, and gave his undivided attention to a rum swizzle and a cigar.

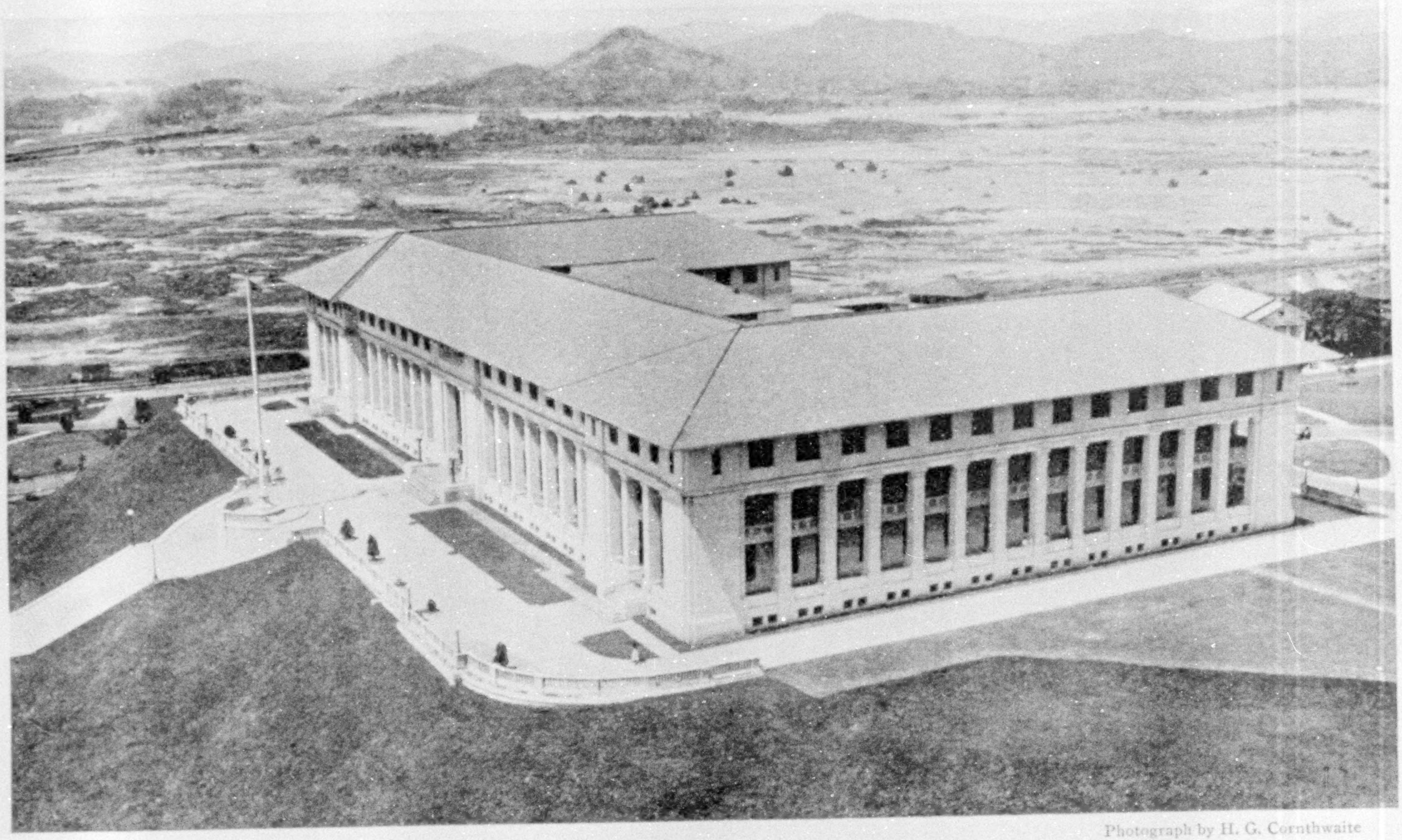
DAD HAD HEARD RUMORS OF THE WAR

The little old man, whom we soon learned to call "Dad," sat mum, with a dazed expression on his face and his head at an angle, after the fashion of the deaf. When he spoke, which he presently did with an unexpectedness that was startling, it was in a low, cultured voice and in English! "What about this Dutch war he had heard rumors of during the last year or two? With Germany, was it? Well, now, and who was winning? Over, eh, and with the Allies on top? That was good, that was good."

He rubbed his wrinkled hands and glared round on the assembled company with an air of triumph, but without making any appreciable impression on the owner of Cristobal or the "chief" of police.

"Dad" was a type, if ever there was one, of the educated ne'er-do-well, hidden away in the farthest corner of the earth to avoid those things that most of us deem so desirable. He had a split bamboo house on the beach, a wife who could cook, freedom, and God's sunlight. What more did man desire?

He had run away to sea at the age of seventeen, run away *from* sea two years



Photograph by H. G. Cornthwaite

AN AIRPLANE VIEW OF THE PANAMA CANAL ADMINISTRATION BUILDING, BALBOA HEIGHTS

According to the testimony of the adventure-seekers aboard the *Dream Ship*, "things are done in a few seconds and utter silence" on the Panama Canal "that would take hours and pandemonium elsewhere." The miracle of passing a ten-thousand-ton liner from the Atlantic to the Pacific through six locks and forty miles of tortuous channels has been performed in six and a half hours (see text, page 10).

later at the Galapagos Islands, and remained there ever since. This was the second time he had spoken English in fifty years; so we must excuse his halting diction. But the tales he could tell, the tales! He was here when the pirates of the South American coast murdered for money, even as they have a knack of doing to this day, and hid the loot at their headquarters in the Galapagos Islands, silver and gold—boatloads of it.

He had built a cutter with his own hands and sailed in search of this same loot, only to encounter the then owner, still guarding his ill-gotten gains, though reduced to nakedness and hair. At a distance "Dad" had seen him first and, mistaking him for a mountain goat, had shot him through the heart.

It was the first man he had killed, and he could not stay on the island after that, especially at night.

Afterward I asked the owner of Cristobal if one might believe half the old man said, and he nodded gravely.

"There is much, also, that he does not say," he added with a smile.

TREASURE STILL LIES HIDDEN IN THE GALAPAGOS ISLANDS

There is undoubtedly treasure still lying hidden in the Galapagos Islands. Two caches have been unearthed, silver ingots and pieces of eight respectively. The finder of one built himself a handsome hotel in Ecuador, the other drank himself to death in short order. But there is definite proof that there is more.

As a field for the treasure-hunter, it is doubtful if any place in the world offers better chances of success today than the Galapagos Islands; but—and there is always a "but"—the uncertainty of wind and current among the islands make it impossible for a sailing ship to undertake the search, a motor auxiliary is too unreliable, and even a small steamer is too large for the creeks and reef channels it would be necessary to negotiate.

With a full-powered launch and diving apparatus, and a parent ship in attendance, and unlimited time, money, and patience—but these be dreams beyond the reach of a penniless world-wanderer—dreams, nevertheless, that will assuredly one day be realized.

No one thinks of the Galapagos Islands. Situated a bare six hundred miles from the American coast-line, in the direct trade route between the South Pacific Islands and the United States of America, this group is seldom visited more than twice a year, and then for the most part by Ecuadorean schooners.

The veriest atoll in the South Pacific receives more attention, and with not a tithe of the cause. The cause? Well, come with us to the hacienda of the owner of Cristobal and you shall see.

PRECISELY ON THE EQUATOR

For this purpose it is necessary to transfer one's activities from the heaving deck of the *Dream Ship* to the equally heaving back of a mountain pony and lope for an hour up a winding, boulder-strewn track through a wilderness of low scrub and volcanic rock.

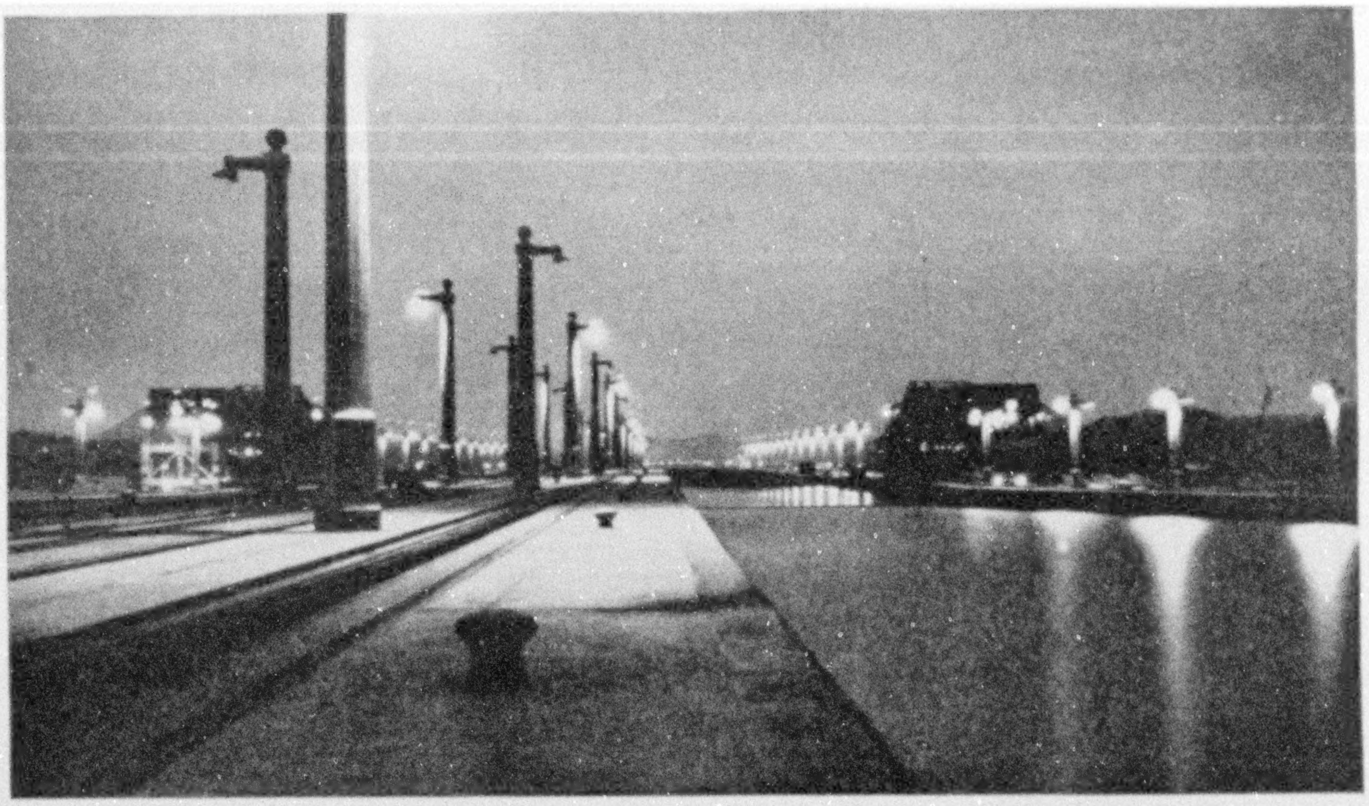
"Still an ash-heap," you think; "nothing but an ash-heap." Then you surmount a ridge, the last of half a dozen, and rein in to breathe your pony and incidentally to marvel.

You remind yourself that you are precisely on the Equator; yet it is positively chilly up here. A green, gently undulating country, dotted with grazing cattle and horses, patches of sugar-cane, coffee bushes, and lime trees, stretches away to a cloud-capped range of mountains.

The soil is a rich, red loam, almost stoneless, and scarcely touched by the plow. There are 3,500 head of cattle at present on Cristobal Island, and it could support 50,000 with ease. There is no disease and no adverse climatic condition with which to contend, and at three years' old a steer brings $100 (gold), live weight, at Guayaquil—when a steamer can be induced to call and take it there.

There are a few hundred acres under cultivation when there might be thousands, and two hundred bone-lazy peons do the work of fifty ordinary farm hands.

Looking down on this fertile valley, it is hard to realize that one is standing on the lip of a long-extinct crater, that in reality Cristobal is a series of these, dour and uninviting to a degree, viewed from outside, but veritable gardens within. And there are four other islands in the Galapagos group—some smaller, some



Photograph by H. G. Cornthwaite

PEDRO MIGUEL LOCKS ILLUMINATED AT NIGHT: PANAMA CANAL

"Something happened to us that night at Pedro Miguel. Looking back on it all, I can hardly persuade myself that it is not a dream" (see text, page 15).

larger, than Cristobal—uninhabited and exactly similar in character. Nominally, they belong to Ecuador. Here, surely, is a new field for enterprise.

In the midst of the valley, situated on a hillock and surrounded by the peons' grass houses, is the owner's house. Here we met, at a dinner of strange but appetizing dishes, the accountant and the *comisario*, the former a rotund little gentleman with very long thumb nails (the insignia of the brain worker), which he clicked together with gusto when excited or amused; the latter a tall, handsome youth and something of an exquisite, if one may judge by cream-colored silk socks and an esthetic tie.

DINNER, A CHEERFUL OCCASION

It was a cheerful occasion, followed by the best coffee I have ever tasted and songs to a guitar accompaniment.

Out in the compound, under the stars, the peons also indulged in a New Year *fiesta;* so that by midnight the place was a blur of tobacco smoke, oil flares, thrumming guitars, gyrating, bright-hued ponchos, with their owners somewhere inside them, dogs, chickens, and children.

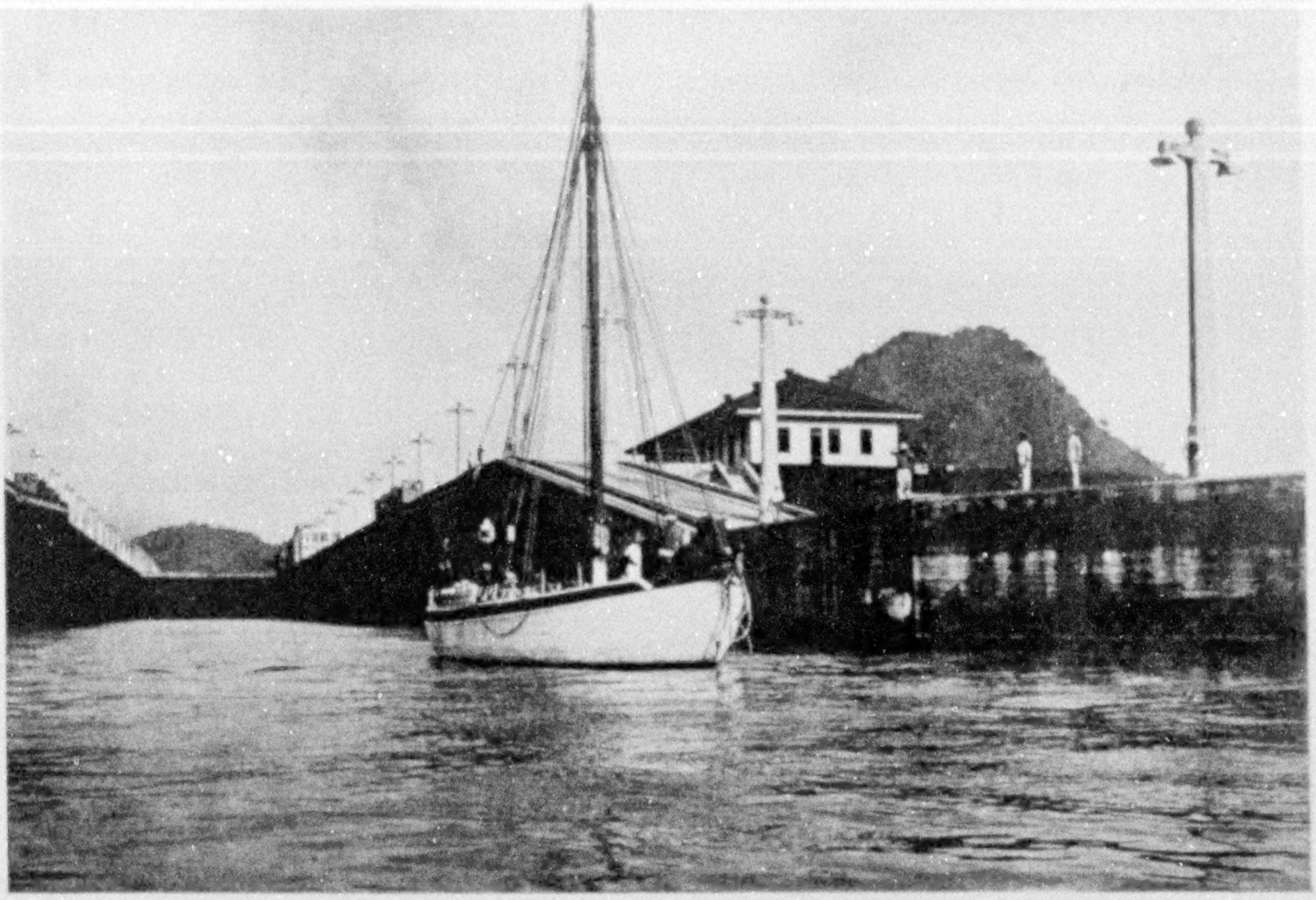
Every one seemed thoroughly happy and contented. And, after all, what else matters? That is the Ecuadorean point of view, and who shall say it is a bad one?

ONE OF THE MANIFOLD JOYS OF ONE'S OWN SHIP

A star-lit ride to the beach, a few strokes of the oars, that carve deep caverns of phosphorescent light in the inky waters, and we are again aboard. And herein lies one of the manifold joys of one's own ship. One may travel at will over the highway of the earth, carrying his home and his banal, but treasured, belongings with him. Like the hermit-crab, he may emerge where and when he wills, take a glimpse at life thereabouts, and return to the comfort of accustomed surroundings—a pipe-rack ready to hand, a favorite book or picture placed just so.

Sheltered by a coral reef that broke the force of the Pacific rollers and with holding-ground of firm, white sand, we made up arrears of sleep that night, and scattered after breakfast to explore the beach.

There was a lagoon swarming with duck, not half a mile inland, that attracted Steve and his new twelve-bore



Photograph by Ralph Stock

THE "DREAM SHIP" FLOATS OUT OF THE MIRAFLORES LOCKS (PANAMA CANAL) INTO THE PACIFIC OCEAN

gun like a magnet. Peter interviewed the lighthouse-keeper's wife anent cooking for us during our stay, and I—I lazed; it gives one time to notice things that escape the attention of the industrious.

A steam-engine was chugging somewhere behind the belt of stunted trees that fringed the beach, and I found it to be a coffee-grinder fueled, if you please, with sawed lengths of lignum-vitæ—a furnace of wood at something like $5 a stick in most countries! I should like to have seen the face of a block-maker of my acquaintance at such vandalism. But here it is nothing of the sort. Little else in the way of indigenous scrub grows on Cristobal.

WHY DAD DIDN'T FINISH HIS SHIP

Mechanically gravitating toward "Dad's" split-bamboo abode, I came upon him seated on a log, staring meditatively at the crumbling skeleton of what had been, or was at one time going to be, a ship.

"Why didn't you finish her?" I shouted into his "best" ear.

He stared at me in a daze; then burst forth in Spanish, until I succeeded in convincing him that he might as well talk double Dutch.

"Of course, of course," he muttered. "I forget; Lord, how I forget. It's queer to me that I can speak English at all after all these years; but I can; that's something, isn't it?"

"Sure thing," I yelled; "keep it up. Tell me why you didn't finish your ship."

He pondered the matter; then spoke slowly:

"I told you of the other I built—and why. Well, I ran her on a reef—splinters in five minutes. Took the heart out of me for a bit, that did.

"Then I began to think of that loot again. I do still, for that matter; can't help it. You see, I think I know where it is. So I started on this one." He nodded toward the hulk, silhouetted against the crimsoning sky.

"I'd got to the planking when it occurred to me I'd want a partner for the

Photograph by Earle Harrison

THE PUBLIC SQUARE, PANAMA CITY

The cities of Panama and Colon, at the Pacific and Atlantic ends of the Panama Canal, are under the authority of the Republic of Panama, but complete jurisdiction is given the United States in both cities and their harbors in all that relates to sanitation and quarantine.

job, at my age; and who could I trust? They'd slit your throat for $10 in those days. They murdered the present owner's father in cold blood. I wouldn't put it beyond 'em to do the same to this one if it wasn't that he's a smart lad and carries the only firearms on the island.

"No one's come here since, no one that I'd trust. . . . Then, too, what if I found the stuff? What good would it do me—now?" He spread out his delicately shaped hands in a deprecating gesture. "I should die in a month if I left here. Finest climate on earth, this is. . . ." Suddenly he laughed—a low, reminiscent cackle of mirth.

"But that wasn't all that decided me. I'd got to the planking, Guayaquil oak it was, and I was steaming it on when a nail drew, and that plank caught me in the chest, knocked me six yards, and broke a rib. It's broken yet, I guess; there was no one to mend it. Well, that finished it. I wasn't meant to build that ship."

He stopped abruptly and stared down at his battered, rawhide shoes.

SHALL THE DREAM SHIP BECOME A TREASURE SHIP?

The inference was obvious.

"Well, what about it?" I suggested.

He looked up at that.

"I've been thinking about it ever since you came here," he confessed. "I'll go with you; but mind this, you musn't curse me if nothing comes of it. I don't promise anything. All I say is I think I know where the stuff is, if some one hasn't gotten it."

"I'll let you know tomorrow," said I, and left him sitting there.

Was the man senile? There was nothing to make one think so. Was he a liar? There was equally nothing to prove it. At least half his story was a matter of island history.

We of the *Dream Ship* held a committee meeting on the subject of loot that evening. We discussed it from every angle, and came to the conclusion that, with the present atrocity called a motor auxiliary and the weather conditions of the group, we might take three days over the business and we might take three months; that the chances of finding something were outweighed by the risk of losing the ship, and that we were in pursuit of something sufficiently visionary, anyway, so we had better get on with it.

The voting went two to one against, and I leave you to guess who's was the deciding voice.

I give this interview with "Dad" for what it is worth, and simply because I see no prospect of undertaking the search as it should be undertaken. I am aware that it reads like the purest romance, but it is true in every particular, as any one will soon discover on visiting Wreck Bay, San Cristobal, Galapagos Islands.

The old man still waits there on the beach for a ship and some one he can trust; but judging by his frail appearance (he is seventy-seven), he will not wait much longer.

Often during the days that followed I found myself standing at the *Dream Ship's* rail, looking seaward to a dim outline of mountains against the blue, and wondering. . . . But only the ash-heap knows.

* * * * * * *

Tomorrow the owner of Cristobal, the accountant of the elongated thumb nails, and the exquisite comisario are to dine with us (on Heaven and our cook alone know what), the next day we hunt the wily duck among the lagoons and marshes of the island, and the day after that, D. V., we continue the pursuit of our dream across three thousand miles of South Pacific Ocean, west-sou'west, to be exact.

Chapter III

More nonsense has probably been written about the South Sea Islands than any other part of the world. The library novelist, the globe-trotting journalist, and a reading public athirst for exotic romance have all contributed to this end; so that at the very outset of this paper I find myself at a loss. In short, "these few remarks" may be taken as an apology and a warning.

I have nothing to offer on a par with the standard article, such as struggles with sharks, conflicts with cannibals, or philandering with princesses. My line, I fear, consists of facts as I find them.

THE COMISARIO PLEADS FOR PASSAGE ON THE DREAM SHIP

The *Dream Ship* lay in Wreck Bay, Galapagos Islands. Her crew had just finished watering, or rather transferring 300 gallons of a doubtful-looking fluid from the beach reservoir to the ship's tanks by means of kerosene tins, a rickety landing stage swarming with sand flies, and an equally rickety dinghy.

We were, in fact, enjoying a spell to the accompaniment of vast quantities of coconut milk before setting sail for the Marquesas Islands, 3,000 miles distant, and were in no mood for an interruption, which is probably why it came. A pigmy figure on the landing was apparently dancing a hornpipe and emitting strange cries.

"Who is it, and what the — does he want?" I queried with customary amiability.

"It's the *comisario,"* said Steve, with binoculars upheld in one hand and a brimming coconut shell in the other, "and he's probably found that we need a bill of health or clearance or something."

I believe I sighed. I have a notion that Steve swore, and I am quite sure that we rowed ashore and interviewed the *comisario,* the handsome youth whose silk socks and passionate tie contrasted strangely with his surroundings. He still danced.

"He says that it is necessary that he should accompany us," Steve translated.

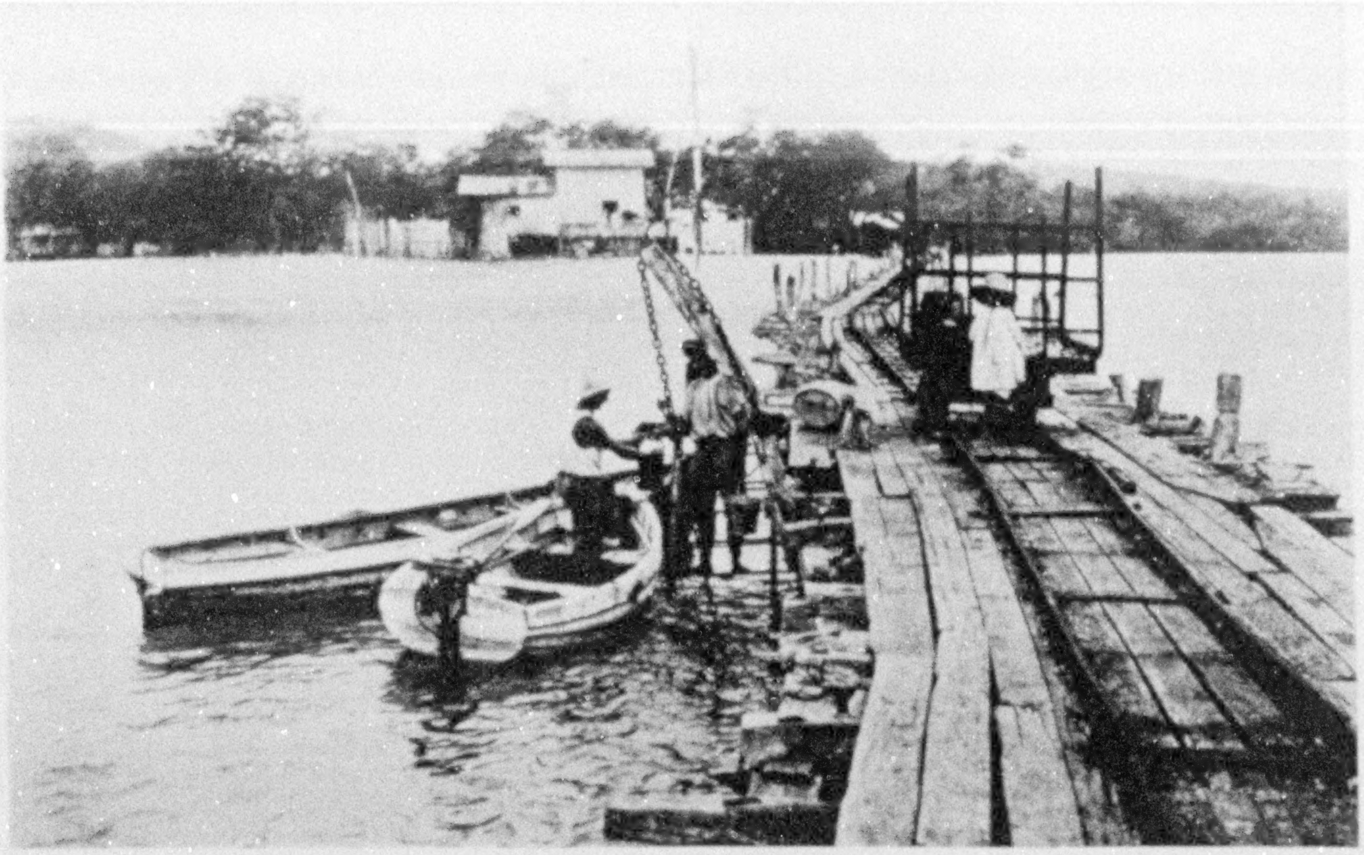
"To the Marquesas?"

"To anywhere."

"Really, and where does the necessity come in?"

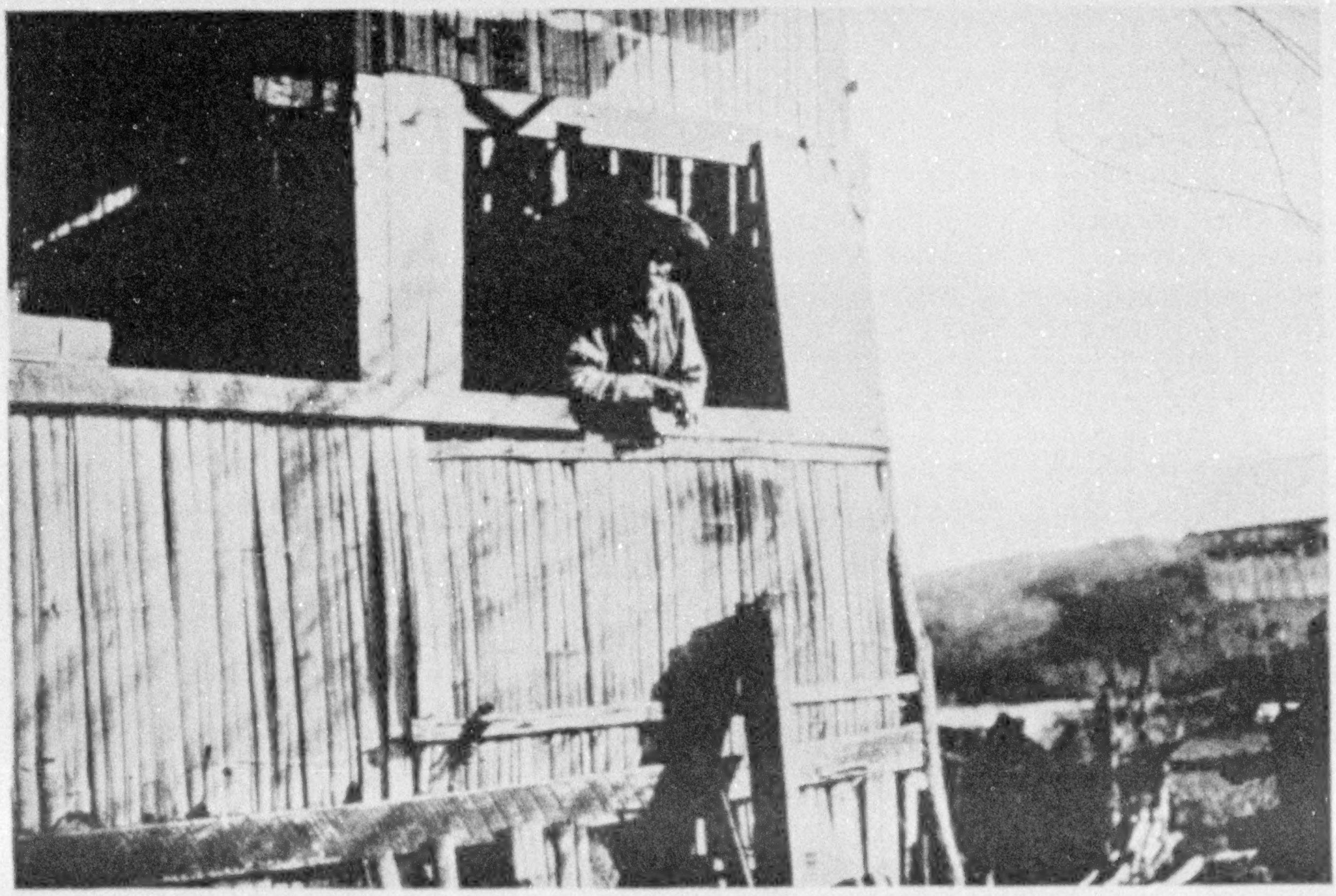
After still further variations of the hornpipe and a prodigious outflow of Ecuadorian Spanish, the following was evolved:

They were after him—a trifling indiscretion in the matter of issuing grog licenses to the peons. The Ecuadorian Government was to blame. They expected an official to live on $20 a month and nothing else! How was it possible? Moreover, the President himself, elected on a wage basis of $40 a month and bring



THE RICKETY LANDING STAGE IN WRECK BAY, SAN CRISTOBAL, OF THE GALAPAGOS GROUP, THE "ASH-HEAP" OF THE PACIFIC

One of the crew of the *Dream Ship* in a dinghy is completing the job of transferring 300 gallons of doubtful-looking fluid from the beach reservoir to the vessel by means of kerosene tins. This water was transformed into an "aquarium" of energetic animalculæ before the ship reached the Marquesas Islands (see text, page 30).

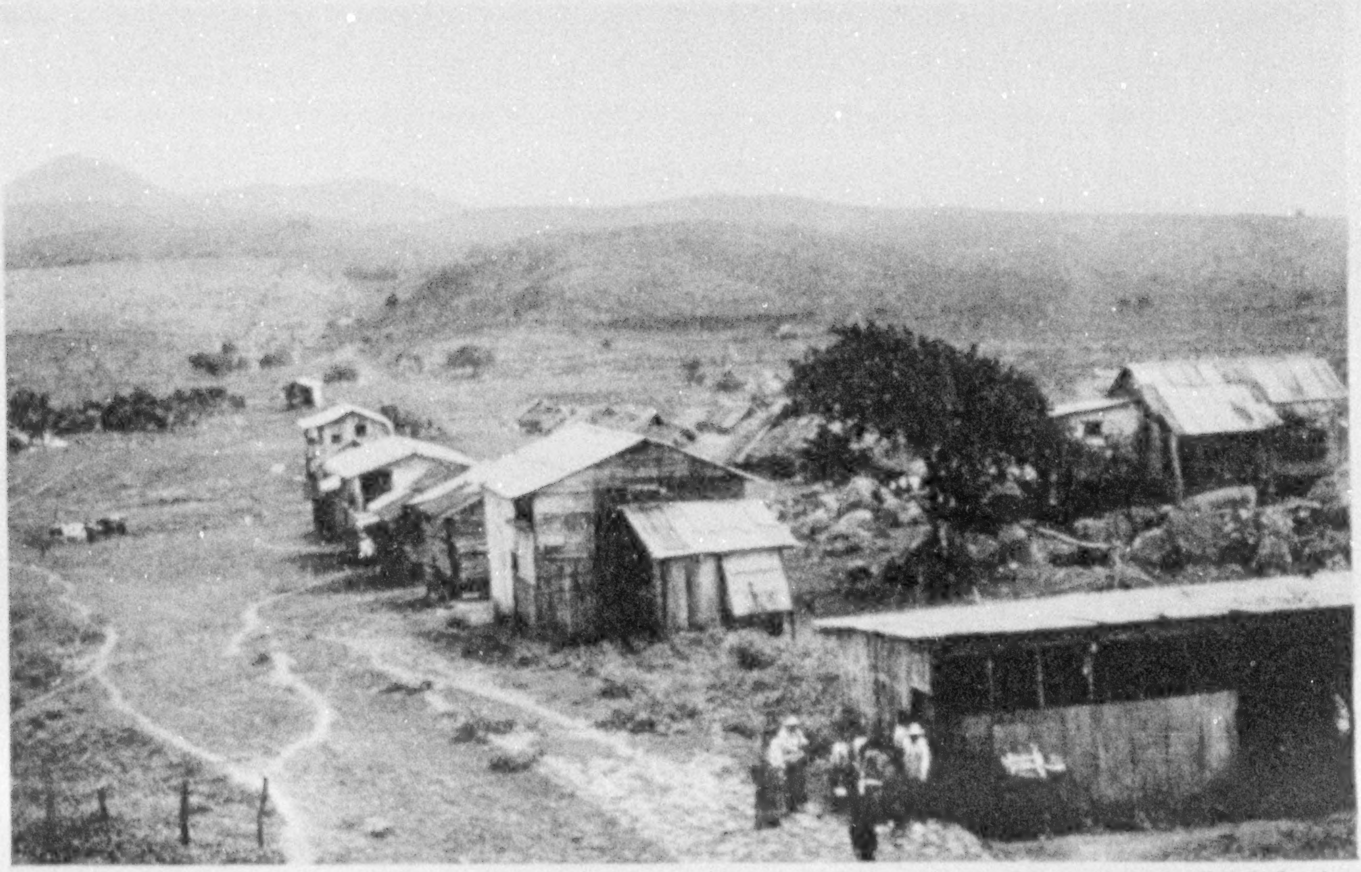


Photographs by Ralph Stock

"DAD," WHO HOLDS THE SECRET OF HIDDEN TREASURE AMONG THE GALAPAGOS ISLANDS (SEE TEXT, PAGE 27)

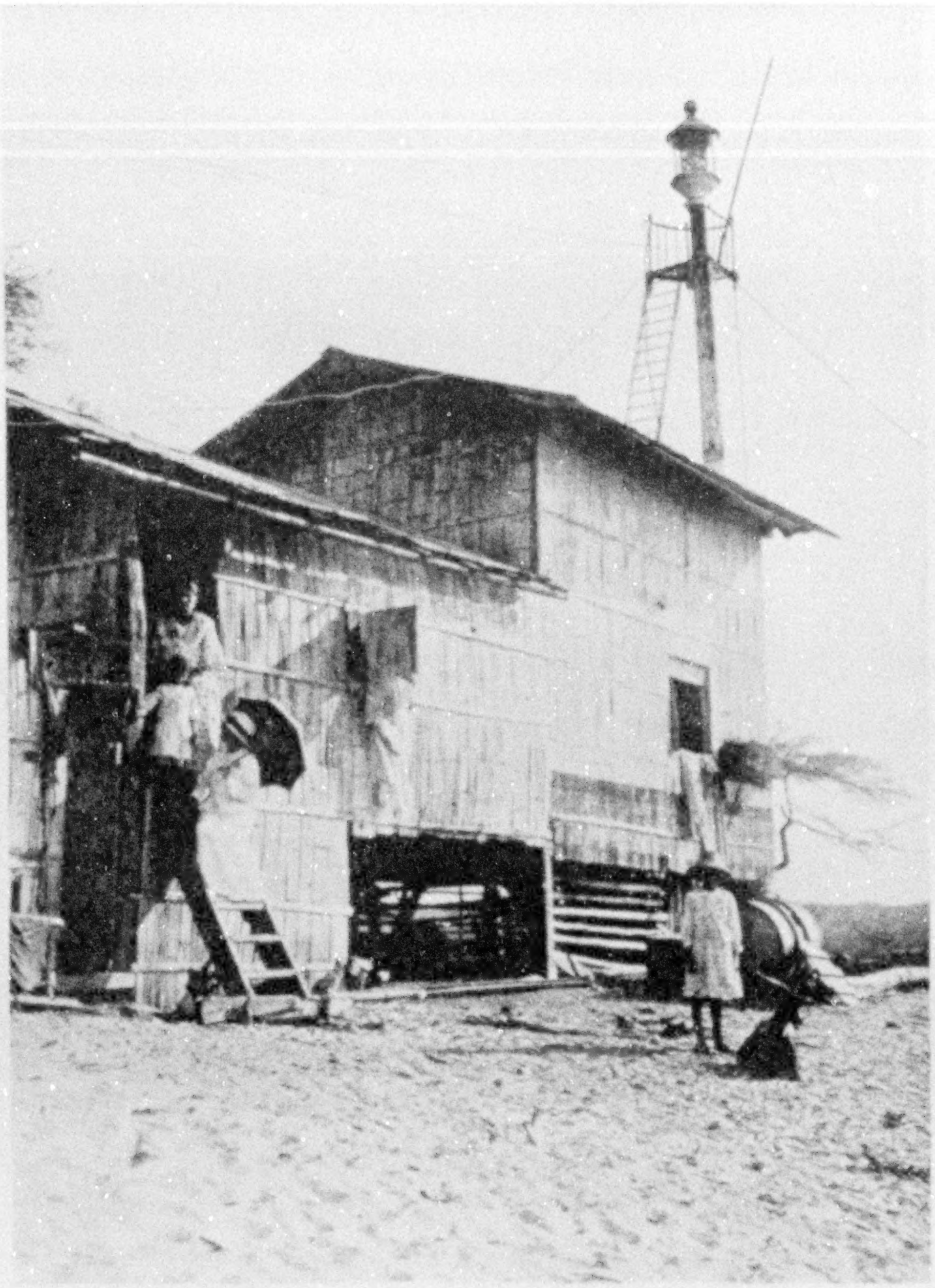
THE OWNER OF SAN CRISTOBAL ISLAND (HORSEMAN IN THE CENTER) AND TWO OF HIS ADMINISTRATION OFFICIALS

The owner is a young man of twenty-five, who spent four years in Paris before marooning himself upon his equatorial possession. His hospitality to the *Dream Ship's* crew took the form of a New Year's celebration.



Photographs by Ralph Stock

THE PEON QUARTER ON SAN CRISTOBAL, THE MOST POPULOUS ISLAND OF THE GALAPAGOS ARCHIPELAGO



Photograph by Ralph Stock

PETER INTERVIEWS THE LIGHT-KEEPER'S WIFE ON SAN CRISTOBAL (CHATHAM) ISLAND

The name of the Galapagos Archipelago is derived from *galapago*, a tortoise, on account of the giant species peculiar to the islands. Owing to the isolation of the Galapagos group, these tortoises were of special value to Darwin in his studies relating to the "Origin of Species."

your own blankets, would be getting the boot in a short three months, and with him went every one—every one!

What was then to happen to the officials he had placed in power? More important still, what was to happen to this particular official? He must accompany us. It was the only possible solution. He would work. *Carramba*, how he would work! and for nothing but his passage to anywhere—anywhere!

Steve and I exchanged glances. The entire crew of the *Dream Ship* was, it may be mentioned, exceedingly tired of cooking. The *comisario* seized on our silence.

SEÑOR BILL JOINS THE CREW

"Maybe we thought he could not work!"

With a dramatic gesture he tore from his neck the passionate tie, from his feet the silk socks, from his back a violently striped shirt, and stood revealed in a natty line of undervests.

"Poor devil," said I, thinking of the *Dream Ship's* fo'castle in a seaway.

"Poor nothing," said Steve. "He wants work; let him have it."

And that was how Señor ——, henceforth known as "Bill," came to join the *Dream Ship*.

We sailed and sailed before a steady southeast trade wind for twenty-two days, during which the *comisario* suffered alternately from seasickness, homesickness, and sheer inability to to do anything but smoke cigarettes and sleep. Our water tanks, under the magic wand of the Galapagos beach reservoir, transformed themselves into aquariums of energetic animalculæ, and our entire biscuit supply crumbled to dust under the onslaughts of a particularly virulent red ant.

But these be incidentals to life aboard dream ships, and at the first sight of Nukuhiva faded to little more than amusing memories.

A fine island this—as fine a volcanic island as one will find anywhere. Sheer walls of cloud-capped rock 6,000 feet high, some literally overhanging the crystal-clear water, and all embossed and engraved with strangely patterned basalt. There are pillars, battlements, and turrets; so that with half-closed eyes it seems one is approaching a temple, a medieval castle, a mosque of the East. And the valleys—deep, river-threaded, verdure-choked valleys — fading away into mysterious purple mists! But it is little better than an impertinence to attempt a description of Nukuhiva after Melville's "Typee."

Photograph from Ralph Stock

ALLEGED MUSIC ON THE CLARINET: CABIN OF THE "DREAM SHIP"

Owing to the fair winds encountered throughout most of the voyage, it was seldom necessary for more than one of the three voyageurs to remain on deck at a time. The watches were apportioned four hours on and eight off.

GUESTS OF FRENCH IN TAI O HAE

For once the monstrosity in our engine-room was induced to exert three of its four cylinders, and we entered the harbor of Tai o Hae in style. It was as well, for a trim trading schooner flying the French flag was at anchor close inshore, and her entire crew lined the rail to see what manner of insect had invaded her privacy.

"Where are you from?" hailed a surprisingly English voice as soon as our anchor chain had ceased its clamor.

"London," we chorused.

"Well, I'm damned!" came a response, evidently not intended for our ears, but audible nevertheless.

In rather less than three minutes a whaleboat-load of visitors was aboard the *Dream Ship*, and the silent bay echoed to a fusillade of question and counter-question.

There followed a dinner at the trading station, on a wide, cool veranda, where, under the influence of oysters, California asparagus, fowl, bush-pig, taro root, and French champagne, we became better acquainted with our hosts, two as amiable Frenchmen as ever I met. They represented a trading company of Papeete and lived as only Frenchmen appear to know how to live.

The Marquesans, we gathered over coffee and cigars, were dying rapidly of consumption, introduced in the form of Panama fever by laborers returning from

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canal construction. The fever afterward developed into the white plague by reason of the natives' unresisting, if not acquiescent, nature. And when all were gone, what then? Chinese.

The Chinese appear to be the answer to most questions in the South Pacific today. They come; it costs them but $50 to land; and after that they grow—*mon Dieu*, how they grow!

And can nothing be done? A shrug of the shoulders and the offer of a refilled glass are the answers of the Frenchman. But a short time now and he personally will be in a position to return to his beloved Paris, or Marseilles, or Brittany.

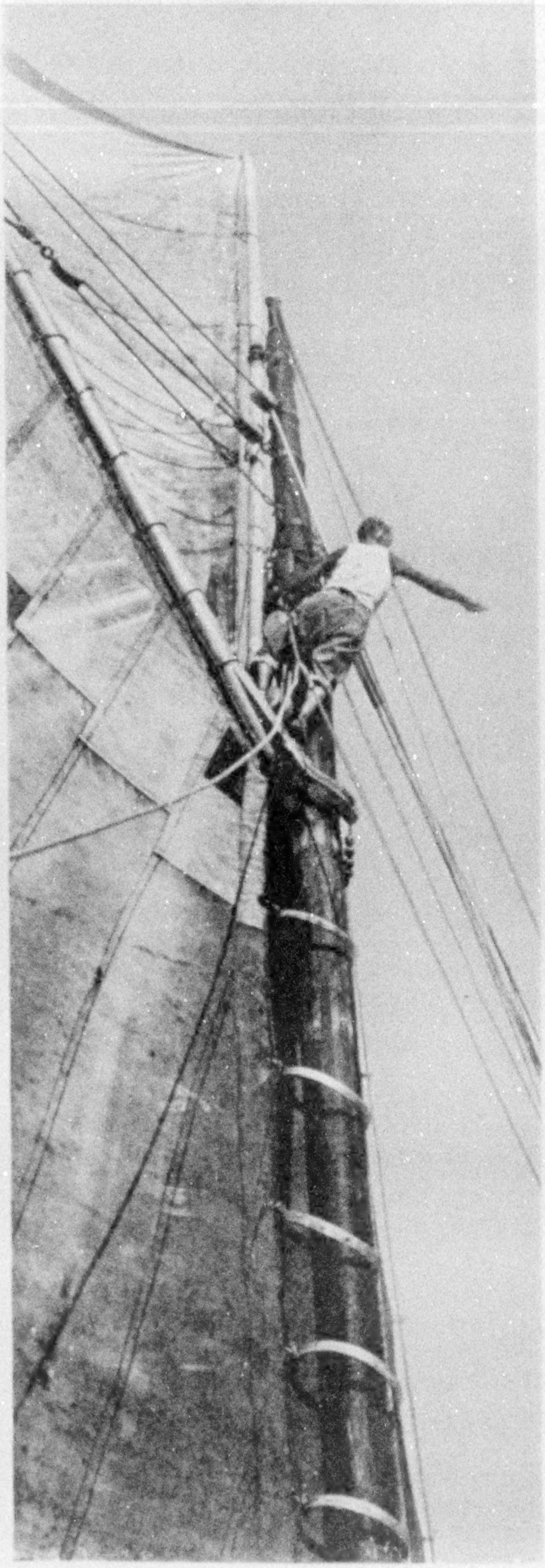
But we had lately returned from dealing with the Boche; so had our hosts. We drank respectively to the Royal Field Artillery, the Mitrailleuse, the Machine-gun Corps, and the incomparable French Infantry. What of it, if we continue the sport on the morrow, among the wild cattle and goats of Nukuhiva? Tomorrow, then, at 5 o'clock.

OFF ON A HUNT FOR WILD CATTLE AND GOATS

The schooner, scheduled at daylight to load copra worth $500 a ton, was cheerfully detained for the trip and loaded to capacity with bottled beer, coughing Marquesans, and a variegated armory of firearms.

We sailed down a coast that it is a sore temptation to describe and landed by whaleboat on a surf-pounded beach. Thereafter we plodded, crawled, and stumbled over as vicious a country as it is possible to imagine—crumbling shale, razor-edged ledges, and deceptive tablelands of knee-high grass that only served to hide the carpet of keen-edged volcanic rocks beneath.

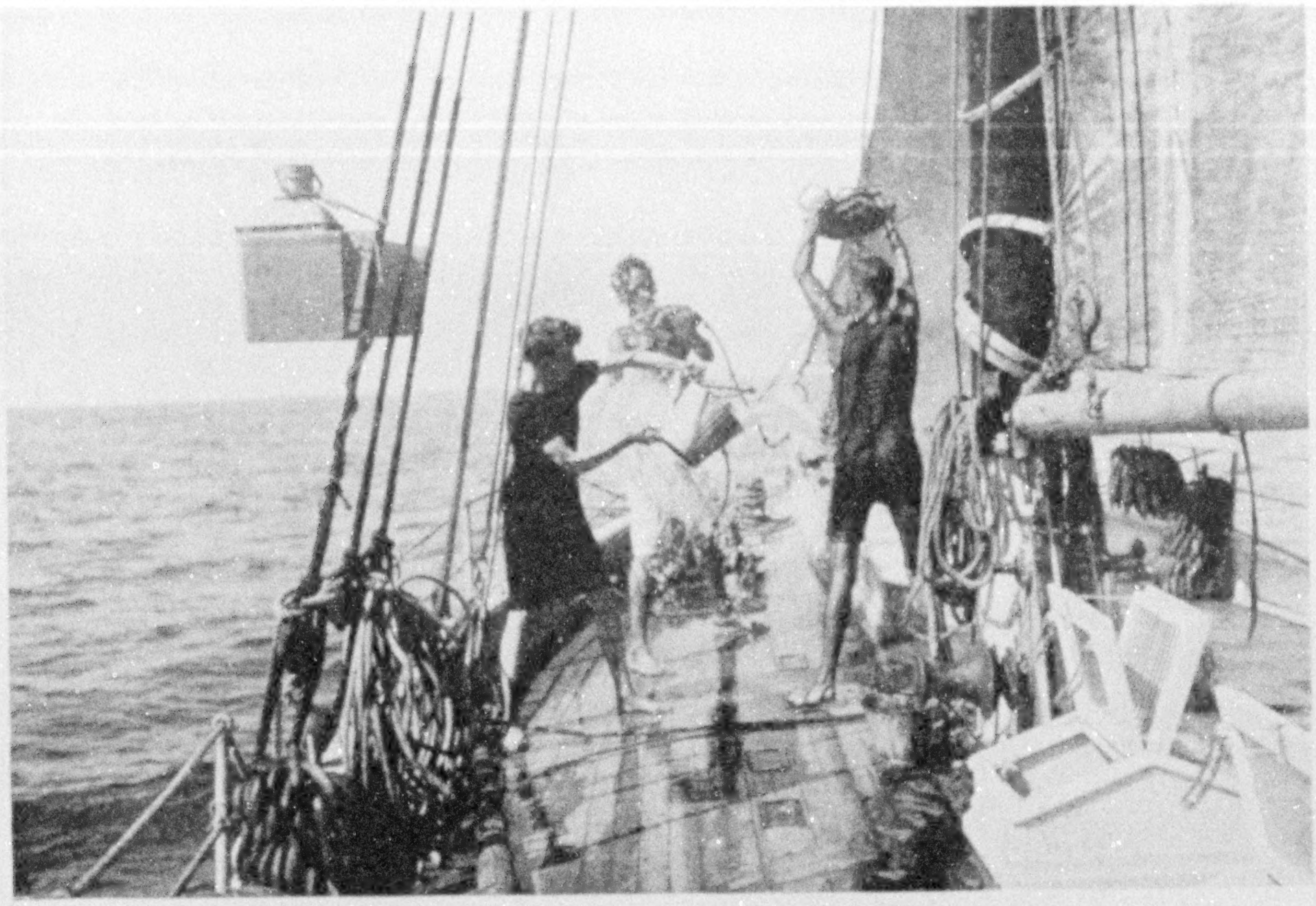
And the heat! But a representative of the incomparable Infantry led the way; and who would not follow to the death, out of very shame? At each halting place the elan of this same representative seemed to increase. Sitting cross-legged on a rock in the meagre shade of a scrub tree, he would discourse on any subject under the sun, while his audience gasped, emptied the perspiration out of their boots, and cursed the *cantene* (a gigantic



Photograph by Ralph Stock

"LAND O!"

This is *not* Peter discovering lost Tower Island of the Galapagos group, however (see text, page 19).



Photograph from Ralph Stock

RECIPROCAL ABLUTIONS ABOARD THE "DREAM SHIP"

native bearing an almost as gigantic sack of bottled beer) for lagging.

I was under the impression that the game was to have been wild; hence my surprise when a herd of something like 150 goats of all ages, from the bearded and maned veteran, or "stinker," down to the daintiest kid, cavorted up to our resting place and sniffed at us inquisitively. It was necessary to fling stones to keep some of the more daring at bay.

So much for goat-hunting in the Marquesas. It is evident that these beasts are so "wild" that they know nothing of man; and who shall say they have missed much in consequence?

FOUR CATTLE BAGGED FROM A HERD OF 50

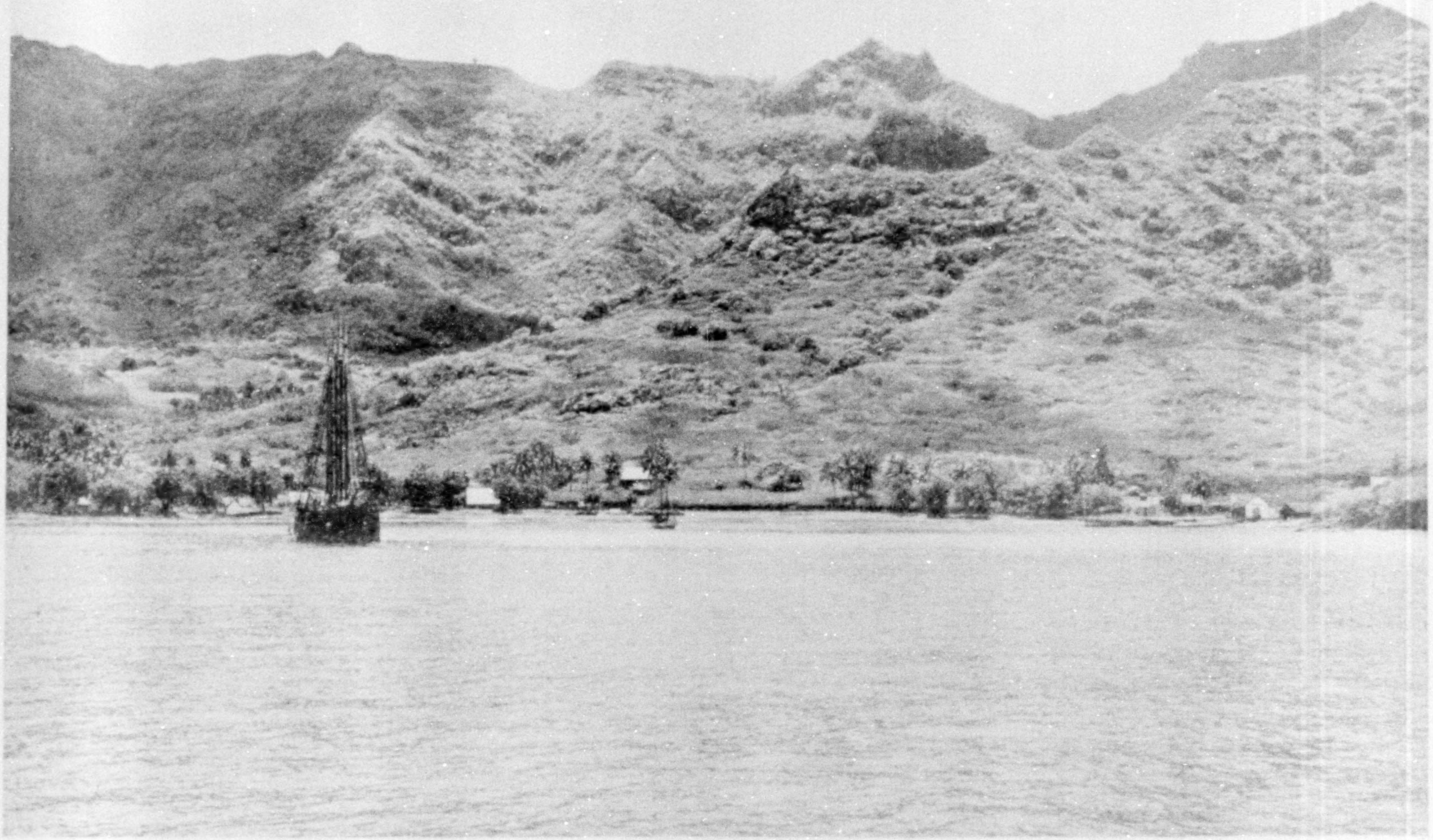
The cattle are a different matter. Shy as deer, they must be warily stalked and shot mostly on the run, at anything from 100 to 150 yards; also, they have an engaging habit of turning when wounded and giving the huntsman the worst possible time in their power, which in the case of a hefty bull or cow with calf is not inconsiderable.

There must have been a herd of something like 50 grazing on the precipitous hillside, and the first shot, fired by an over-anxious Marquesan, against strict orders, sent them scuttling like antelope out of the valley and over a ridge. One fine bull received his medicine from my trusty little Winchester on the very brink, collapsed, and rolled like an avalanche of meat to the bottom.

We bagged four of this herd, and the Marquesans fell on them, quartering and selecting with extraordinary skill, and finally carrying 100 pounds each of solid meat to the beach five miles below. How this last feat was accomplished by a band of ramping consumptives I have no notion, though I saw it done. I only know that after carrying two rifles and a gun over the same country I literally tumbled onto the beach, bruised and bleeding and trembling from sheer fatigue. Even the representative of incomparable Infantry admitted to being tired, and, thank heavens, he looked it!

A NATIVE DANCE, A PAGEANT OF HISTORY

It had been a successful day, I was given to understand, and there followed



Photograph from Dr. Hugh M. Smith

PORT TAI O HAE, NUKUHIVA, MARQUESAS ISLANDS

"A fine island this—as fine a volcanic island as one will find anywhere. There are pillars, battlements, and turrets; so that with half-closed eyes it seems one is approaching a temple, a medieval castle, a mosque of the East" (see text, page 30).

in consequence song and dance aboard the *Dream Ship* until dawn touched the peaks of Tai o Hae.

A native dance is a dreary and monotonous affair to the average white man, because he does not take the trouble to understand. He sees before him an assembly of posturing, howling natives, and seldom realizes that he is witnessing a pageant of history that has never been written or read.

The performance opened with a pantomimic representation of the cruise of the *Dream Ship*. According to the actors' ideas, all aboard suffered acutely from seasickness, were utterly unable to stand upright, and continually looked for land under the shade of an upraised hand. Our vigor in battling with storms was extraordinary; we stumbled over rope ends, clung to the rigging, nearly capsized, and one of us fell overboard, to be rescued, amid shrieks of laughter, by means of a boat-hook and the seat of his pants.

We were a joke, there was no doubt about that, and any one who takes a 10,000-mile journey in a 23-ton yacht to the Marquesas and wants to be taken seriously had better go elsewhere.

From such trivialities the performers passed on to what was evidently their stock repertoire—the history of the Marquesas as handed down from father to son. It was all there in gesture and chant—mighty battles with their neighbors the Paumotans, cannibalism, peace, the advent of the white man with his rum, the plague that still consumes them, and all enacted without resentment.

That is the most astounding thing, that these people who were living their own lives, and surely as happy lives as ours, bear no ill will for the incredible sufferings our civilization has brought among them. Perhaps they do not think, and if so it is as well.

Conceive yourself, if you can, oh denizen of Park Lane, Fifth Avenue, or Champs Élysées, a healthy, upstanding, unclad savage of the South Seas, and living your own life.

You may be a cannibal; and are there no cannibals, and worse, west of Suez? You will be a warrior and fight for your country and your women folk. Is there anything wrong about that?

You will have a stricter moral code than most white folk, but that cannot be helped. You will hunt and fish and gather fruit for your family—in fact, you will live in the only way you know how to live, in contentment.

One day an extraordinary-looking object called a white man presents himself and informs you that you are not living in the right way at all. A much better way, according to this gentleman, is to exchange a ton of your coconuts for a bottle of rum or a death-dealing instrument made of rusty iron.

You are a tolerant sort of person, and you listen and drink his rum. The next day you have an insufferable headache, and, logically concluding that he has poisoned you, you kill him.

But that is not the end. Replicas of him keep arriving, and you find you need his rum and his rusty iron, the one for its elevating properties, the other for its dispatch in dealing with enemies.

OFF TO HUNT PEARL SHELLS

To revert to safer topics, there is pearl shell in the Marquesas. The representative of incomparable Infantry told us so while we sat on his incomparable veranda one morning, consuming large quantities of papia, rolls, honey, and coffee, each in his particular brand of pajamas.

The information brought upon our serene lives at Tai o Hae the white man's blight of avariciousness. Was this thing possible, with shell at $1,000 a ton, delivered at Philadelphia? Yes; he, the incomparable, had seen it through a water-glass, in anything from five to fifteen fathoms, between the islands of Hivaoa and Tahuata.

Why had it not been prospected? It was doubtful if any but he and the natives knew of its existence. Undoubtedly it was worth looking into. He made us a present of the information, to do with as we willed. His cook was an old Paumotan diver, who would no doubt accompany us—Pascal!—accompany us to the island, a bare 90 miles distant. We could take samples of shell to the company in Papeete, and no doubt make arrangements — Pascal!! — arrangements with them to advance working capital in return for a lien on the shell—Pascal!!!

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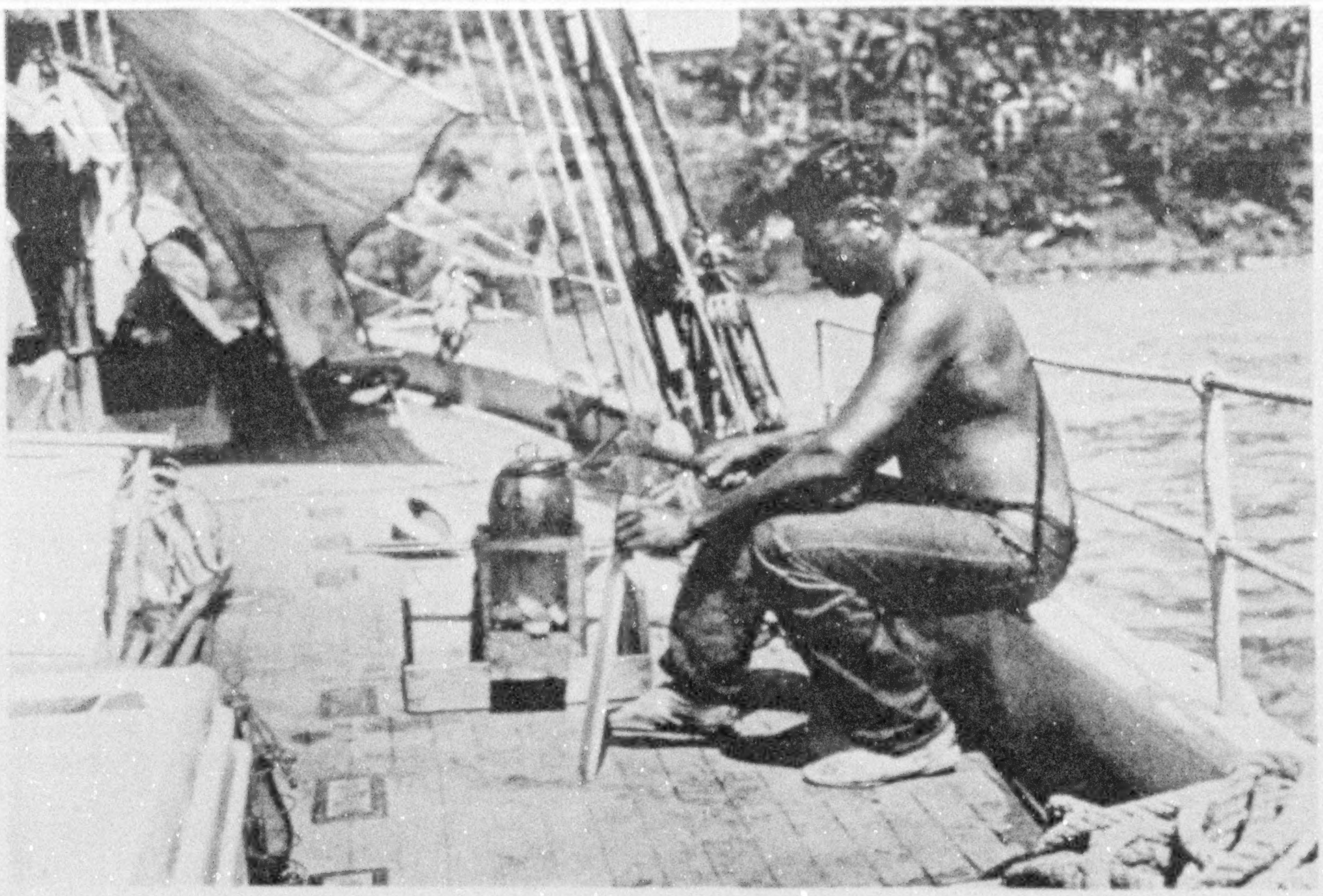


Photograph by Ralph Stock

PASCAL, A PAUMOTAN NATIVE WHO PROVED A WIZARD AS A COOK, BUT A SNARE AND A DELUSION AS A PEARL FISHER

"He could produce savory messes from a kerosene tin, remain under water three minutes, discourse entertainingly in pidgin-English, French, German, Marquesan, and Paumotan, and secure a ship's provision without the annoying triviality of paying for them."

"Monsieur." An enormous Paumotan native stood in the doorway smiling benignly.

He would accompany us. He would cook and he would dive.

PASCAL PROVES A REMARKABLE FORAGER

We sailed that evening, the deck being littered with green bananas, live chickens tied by a leg to bulwark stanchions, a rabbit, firewood, a stove composed of a kerosene tin half filled with earth, and—Pascal.

There was apparently nothing that this extraordinary man could not do. He knew every island of the Marquesas like the palm of his hand. He could produce savory messes from a kerosene tin, remain under water three minutes, discourse entertainingly in pidgin-English, French, German, Marquesan, and Paumotan, and secure a ship's provisions without the annoying triviality of paying for them.

"But whom do we owe for all this?" I asked him, eying the menagerie that surrounded us.

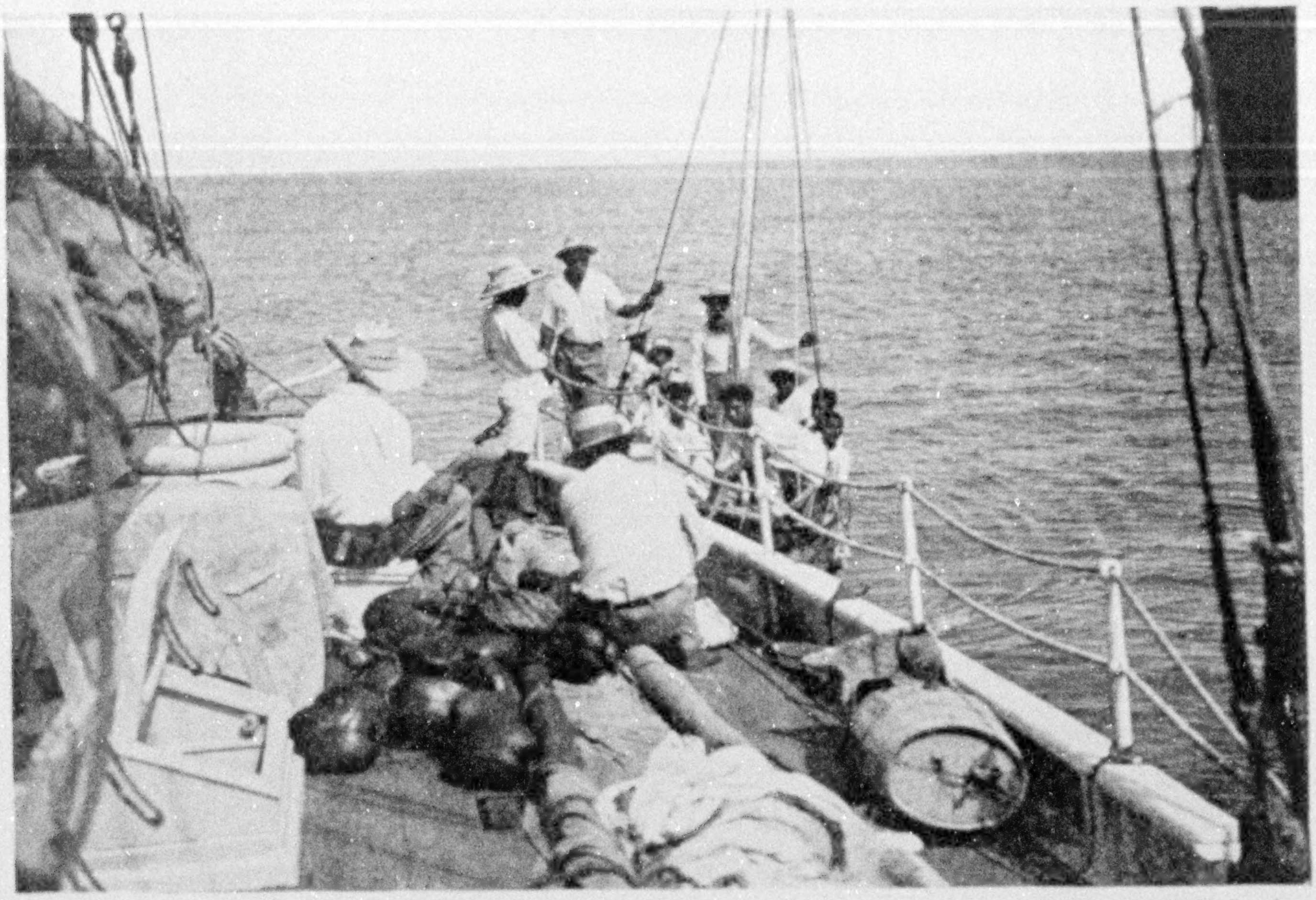
Pascal smiled and waved a hand.

"Rabbit no money," he informed us; "chickens, bananas, all no money. I get um."

Here surely is a solution of the "high-cost-of-living" problem. Take Pascal to the profiteering areas and the thing is done.

Dawn revealed to us Tahuata close abeam. Each island of this group seems more lovely than the last: waterfalls pouring 3,000 feet to the sea, blow-holes at the base of rocky cliffs that spray the air with spindrift and miniature rainbows, deep bays with coral beaches at their head.

But the beauties of nature were not for us on this occasion; we were prospecting. It was a serious business. There might be money in it. After this I can scarce believe that in Paradise itself the white man will not be dogged by the curse of opportunism.



Photograph by Ralph Stock

SOUTH SEA ISLANDERS PAY A VISIT TO THE "DREAM SHIP"

Leaving the *Dream Ship* at anchor a cable's length from shore, we took to the dinghy and explored the floor of the ocean thereabouts through water-glasses. This was the place, Pascal informed us, and, sure enough, there was shell, old barnacle-encrusted shell, but widely scattered.

What of a few samples? Pascal grinned and shook his head. "Shark," he muttered apologetically; which, being interpreted, meant that he refused to dive.

He pointed out that in the Paumotus it was different. In the Paumotus there was always a reef-surrounded lagoon where few sharks found entrance. In the Paumotus men dived in couples as a safeguard. In the Paumotus—

In vain we pointed out that we happened to be in the Marquesas and not the Paumotus; that he had been hired to dive in the Marquesas; that we were really very angry—in the Marquesas. He grinned.

HO FOR TAHITI

In rather less than half an hour, and to Pascal's utter amazement, we had put him and his belongings ashore, paid him his wages, and were under way for Tahiti.

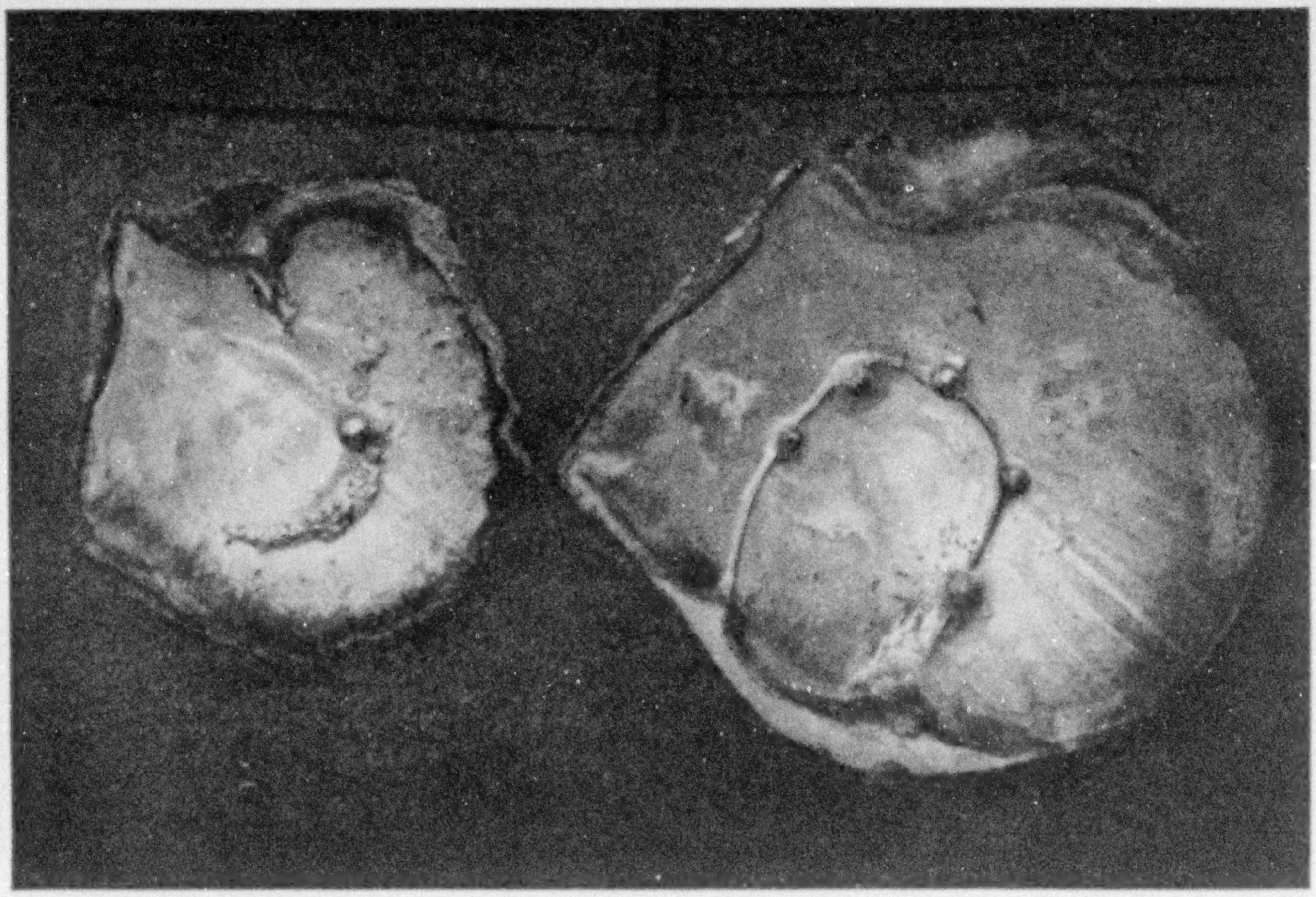
Ah, Monsieur of the incomparable, I rather suspect you of "pulling our legs." Or was it that your innate enthusiasm ran away with you? Or that we should have been less hasty? I do not know. All I know is that you spoke truth; there is shell in the Marquesas—and it is likely to remain there.

CHAPTER IV

From the moment I first set eyes on an atoll it fascinated me, and its lure has not departed with the years.

Think of any place in the world that you have seen, and an atoll is different. It is the fairy ring of the sea. Out of the depths it comes, rearing a vegetation and a people of its own, and often into the depths it goes, leaving no trace. How? Why? Scientists murmur something about the vagaries of the corallitic polyp; but, not being a scientist, I prefer my theory of the fairy ring. That was how it looked to me several years ago, and that was how it looked again from the masthead of the *Dream Ship*.

NATIVES SPEARING FISH IN THE SOUTH SEA ATOLLS



Photographs by Ralph Stock

PEARL BLISTERS ARTIFICIALLY PRODUCED BY "MR. MUMPUS," OF THE SOUTH SEAS (SEE TEXT, PAGE 43)

The pearl is a disease of the oyster; introduce the disease and you will get a pearl, according to this authority, who hopes some day to be able to produce whole pearls as readily as he now produces half-pearls.

We had left the Marquesas seven days previously, and were now becalmed in that maze of atolls known as the Paumotu, or Low Archipelago.

Imagine a circular beach of glistening coral sand and green vegetation from five to fifty yards wide, thrust up through the sea for all the world like a hedge, and inclosing a garden of coral fronds submerged under water so still and clear as to be hardly visible, and you have an atoll as I saw it from the masthead.

There were myriads of them — big atolls, little atolls, fat and thin atolls—fading away into the shimmering heat haze of the horizon. The fairies must have been mighty busy down this way.

I descended to the deck and things mundane. "What to do when becalmed in a network of coral reefs and seven-knot currents" was the problem that confronted us.

A RACE OF MERMEN

I had no text-book on the subject, but by some miracle the thing we called an engine was persuaded to fire on two of its four cylinders, and the *Dream Ship* tottered through the narrow gateway in the hedge—I should say, pass in the reef—and came to anchor in the garden—I mean lagoon.

It was sunrise, and already the pearling canoes were putting out from the village and scurrying to the fishing grounds over the glassy surface of the lagoon.

A fine people, these of the atolls—upstanding, deep of chest, a race of mermen if ever there was one. From birth up, if they are not in the water they are on it or as close to it as they can get. Take them inland and they die. So they squat on their canoe outriggers, smoking, chatting, laughing, until the spirit moves them (nothing else will), and one of their number drops from sight, feet first, with hardly a ripple.

You look down and you see him, as though through green-tinted glass, crouched on the sloping floor of the lagoon. He is plucking oysters as one would gather flowers in a garden. There is no haste in his movements, nothing to indicate that there is any time limit to his remaining down there, under anything from five to fifteen fathoms of water.

A minute passes, two minutes; still he pursues his leisurely way, plucking to right and left and thrusting the shells into a network bag about his neck.

UNDER WATER THREE MINUTES

The man of the atolls is in a world of his own, where none but his kind can follow, and they still squat on their outriggers, chatting and laughing like a crowd of boys at a swimming pool.

One alone seems interested in the diver's movements; his mate, a fair-skinned woman, with streaming blue-black hair, leans over the gunwale of the canoe, looking down through a kerosene tin water-glass.

The diver's dark figure against the pale-green coral becomes more blurred; a stream of silver air bubbles floats upward. Three minutes by the watch have come and gone. To the landsman it seems incredible; and even then there is no haste, no shooting to the surface and gasps for breath.

The dark body becomes clearer in outline as it emerges from the depths, and slowly, quite slowly, floats upward until a jet-black head breaks water and the diver clings to the gunwale of the canoe, inhaling deep but unhurried breaths and exhaling with a long-drawn whistle peculiarly his own.

In what way this whistle helps matters, it is impossible to say, but whether a habit, a pose, or an aid in the regaining of breath, it is universal throughout the Paumotus; so much so that a busy afternoon with the pearlers sounds more like a tin-whistle band than anything else.

With the people of the atolls the ability to remain under water for long periods is more than an art; it is second nature. Instinctively, they do just those things that make one breath suffice for three minutes and sometimes four.

Preparatory to a descent they do not take a deep breath and hold it until the surface is reached again. They fill their lungs with a normal amount of air, which lasts them about a minute and a half; the other minute and a half is occupied in its exhalation. Then, too, every movement below water is made with the utmost conservation of energy; yet a good

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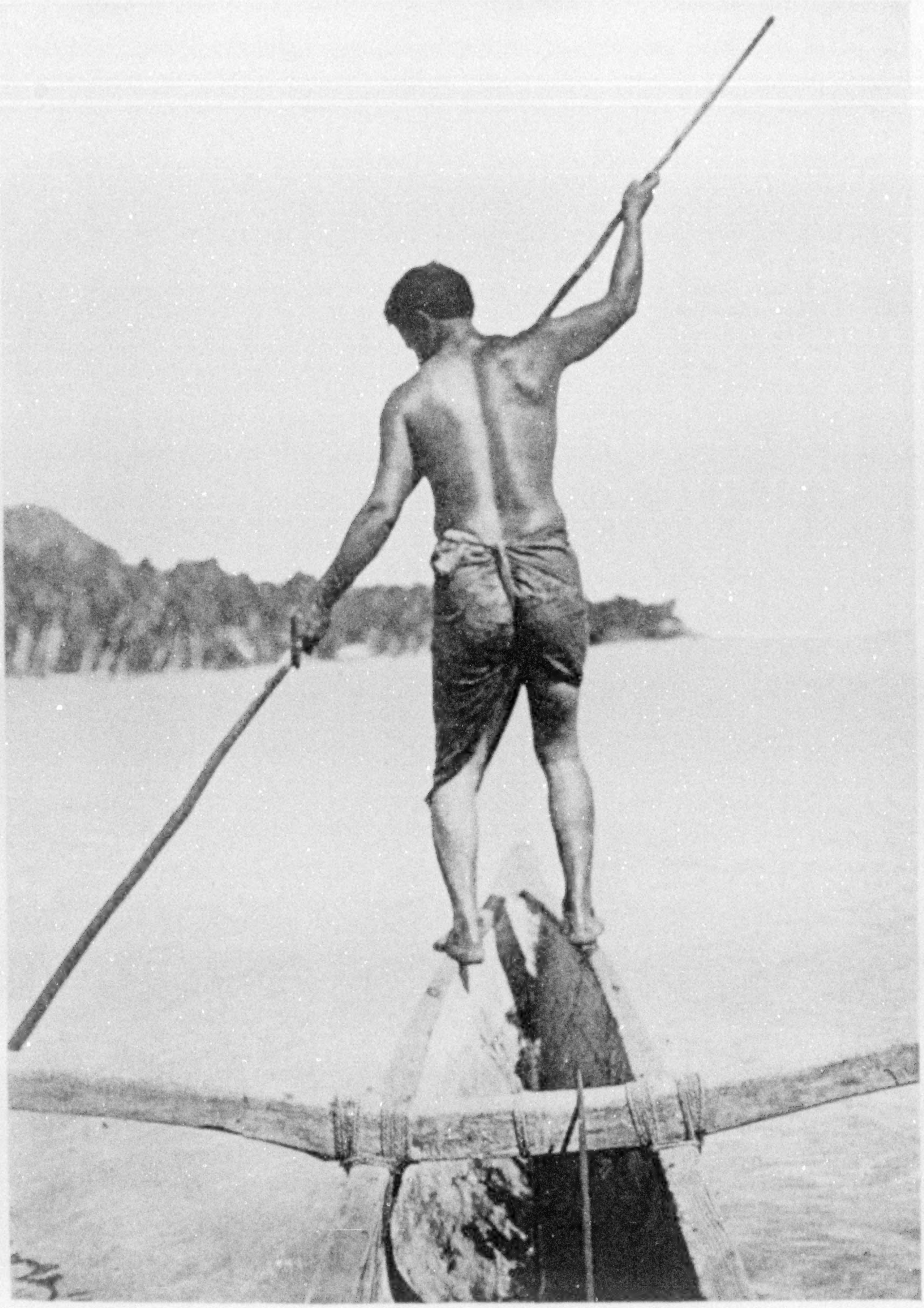

Photograph by Ralph Stock

A MAN OF THE ATOLLS POLING HIS CANOE TO THE PEARLING GROUNDS

Upstanding, deep of chest, the natives of this part of the Pacific are veritable mermen, living in and on the water almost from birth.

diver can bring up 150 kilos of shell in a day, which means in the neighborhood of 600 francs.

DEAFNESS, PARALYSIS, AND IMPAIRED VISION THE DIVER'S LOT

And it is just these same nimble dollars that tempt the Paumotan to abuse his talents, even as others are tempted the world over. For the sake of a few more shells, another cluster a little farther down, he remains below just that trifle longer than is good for him, and in time it tells. The eyes become bloodshot and start from the head, he goes deaf, or paralysis seizes him.

"But the women are the worst," a sun-baked trader informed me; "the worst or the best, as you like to put it," he added grinning. "They'll go on till they burst, or pretty near it. Bargain-counter instinct, I guess. We call it the 'bends.'"

"The 'bends'?"

"Yes, one of 'em goes down, and down; sees some more shell a little lower, and some more a little lower than that. Then she's reaching out for one last flutter at something like twenty fathoms when they get her—the 'bends,' I mean. You can see her fighting against them, but it's no good; they bring her knees to her chin, and she can't straighten up, and she drops the last lot of shell she's gathered, and hates that worse than the 'bends.'"

"What does she do?"

"Nothing, except lie there crumpled up until her mate fetches her up and massages her back to life. Then she's no sooner conscious than she's down again.

HE SWIMS WHEN HE CAN NO LONGER WALK

"Water never kills this crowd; it takes dry land to do that. Why, there's a diver close on fifty years old here, paralyzed clean down one side. He can't walk, but he can swim. He gets them to carry him down to the reef and heave him in; says it's the only place he can get any comfort."

"How about sharks?" I asked.

"Oh, there are sharks all right, but the diver's mate looks after that; gives the signal and they're all in after him double quick."

"Finish him off with knives, eh?"

The sun-baked trader smiled reminiscently.

"Well, hardly," he said. "A dead shark makes a square meal for the others, and that's all. What they need is an example, and they get it. They're cruising about sometimes when they come on one of their number with no tail, one fin, and sundry other decorations that wouldn't exactly please the S. P. C. A. He is not nice to look at, and they clear out of a place where such things are possible.

"When an island's thrown open for pearling, we spend weeks mutilating sharks before the divers'll go down, and small blame to them, I say. Sharks are—well, sharks."

A PEARL RUSH IN THE PAUMOTUS

The casual reader picks up a good deal of information about "gold rushes" and such like romantic undertakings from the plethora of novels on the subject; but who has ever heard of a "pearl rush"? Yet they occur every year in the Paumotus.

The group belongs to the French, and is administered from the local seat of government at Papeete, Tahiti. Here a heterogeneous collection of humanity awaits the opening of the pearling season like a hovering cloud of mosquitos.

There are pearl buyers from Paris and London, representatives of shell-buying concerns from Europe and America; British, Chinese, and Indian traders, speculative schooner skippers and supercargoes, not to mention the riffraff of the beaches, all intent on pickings from the most prolific pearling islands in the South Pacific.

And this is the law of the group—infringed, circumvented, broken, but still the law—that although under French Government, the Paumotus and all they produce belong to the Paumotans.

FRANCE PROTECTS THE NATIVE DIVERS

Still further to protect the native, diving apparatus is banned throughout the group. The oyster, as he brings it from the water, is the diver's property. He must open the shell aboard his canoe before touching land, remove the flesh, and, after testing it for pearls (usually by kneading it so thoroughly between finger

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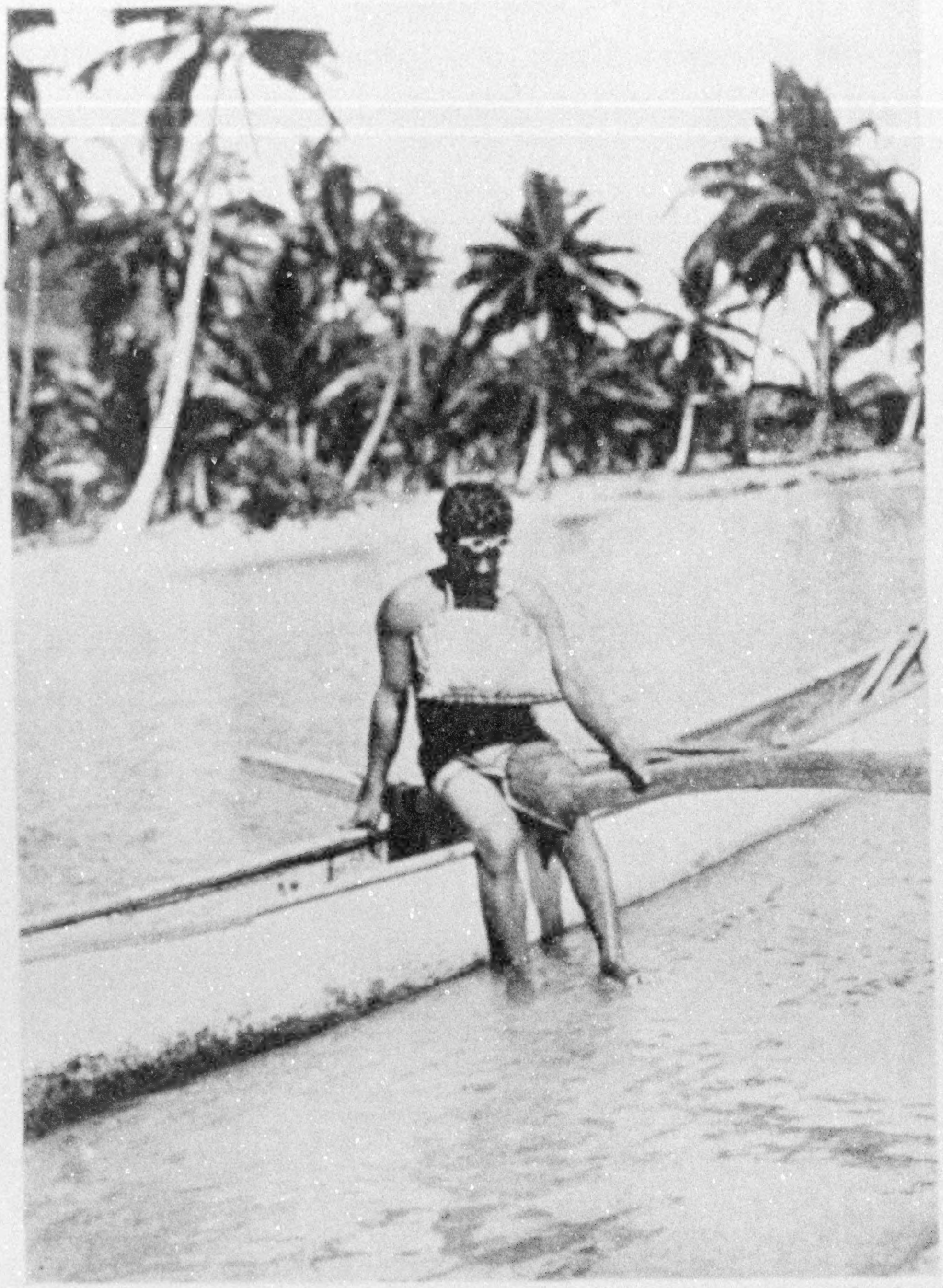

Photograph by Ralph Stock

A PEARL DIVER PREPARING FOR A DESCENT

and thumb as to crush the life out of it), throw it back into the lagoon to propagate its species. Should he find a pearl, it is his also.

It is then up to the cloud of mosquitos before mentioned to get both shell and pearl out of him as best it can. One can imagine the buzzing and biting that ensues.

From the buyer's point of view, the sooner and the deeper he gets a good diver into his debt the better. He then has some hold. Consequently he spoon-feeds his selected divers like the infants that they are. Tinned delicacies of all sorts, Prince Albert suits of unbelievable thickness and cut, silk socks, and stockings are a good diver's for the asking, during the closed season.

With shell at $1,000 a ton in Philadelphia (the largest consumer at the present time) and pearls soaring to apparently limitless heights, all will be well when work starts.

And the diver? From long experience of mosquitos, he is by no means slow. Shortly before the season opens he is presented with a bill that would cause most of us to register apoplexy. He looks at it, grins, and proceeds to dive. He also proceeds to make caches of shell on the floor of the lagoon, only bringing up half of what he collects in payment of his debts. At night he retrieves his cache and sells for cash to the smaller mosquitos who infest the beach.

As for pearls, from the moment the diver's finger and thumb encounter foreign matter in the flesh of the oyster, he becomes about as communicative on the subject as his catch. Should the truth leak out, his find will promptly be confiscated in payment of his everlasting debts, or the wily pearl-buyer will use threats of exposure to reduce the price.

No, the diver, if he is up to snuff, will work his passage to Papeete on a schooner, sell to a Chinaman, who neither asks questions nor tells tales, and proceed to enjoy himself according to his lights.

Blossoming into a Prince Albert suit, a red tie, and silk socks, he will hire a car, load it up with lady friends and execrable rum, and vanish into thin air for a fortnight, at the end of which time he has somehow contrived to get rid of

Photograph by L. Gauthier

FISHING MEN OF TRITI, NEAR PAPEETE, TAHITI

all he possessed and is perfectly prepared to return to his atolls and his debts. He has lived like a white man and cheated the mosquitos; what more can Paumotan heart desire?

PROGRESS HAS NOT DESTROYED PICTURESQUENESS OF PEARL FISHING

The thing we call progress has slain the picturesque in most industries of this world, but not so with pearling in the Paumotus. During the season, the beach of one of these atolls resembles an Old World fair more than anything I can call to mind.

A crazy merry-go-round brays and rocks in the shade of the palms, luring the adventurous to invest three pearl shells in a ride on a broken-necked camel. The ubiquitous movie "palace" has reared its unlovely head, and for more shell or five coconuts one may witness on the shores of a South Sea lagoon the battered remnants of a love affair enacted not far from Los Angeles. I have often wondered what happens to all the worn-out films in the world. Now I know.

This season, and for the first time, the people of the atolls are to be initiated into the mysteries of ice-cream. Truly, the mosquito stops at nothing.

It was down in this part of the world that I met Mr. Mumpus, though that is not his name. To reach him you must pick your way in the motor auxiliary through a maze of reefs, lie off and on, because there is no pass into his lagoon, and plod through blazing sand in a temperature of ninety in the shade, which there is not. But it is worth it.

THE PEARL-MAKER OF THE SOUTH SEAS

You will probably find him in the pearl orchard, a green-lined umbrella in one hand and a dripping oyster shell in the other. He will stare fixedly for upward of half a minute and then say: "How the devil did you get here?" with a brusqueness that is alarming until you get used to it.

In my own case I indicated the *Dream Ship*, looking particularly smart in her recent coat of white paint.

Photograph by Ralph Stock

TAHITIAN BEAUTIES IN A TARO PATCH

It is from the rootstock of this plant that one of the staple foods of the Pacific Islands is made. The fermented paste is known in Hawaii as poi. In temperate regions taro is our ornamental caladium or "elephant's ear."

"What! in that thing?" remarked Mr. Mumpus.

I was smitten to silence for a space.

"I heard you were making pearls," I told him on regaining something of my equanimity, "and thought you might be so good as to tell me about it."

For some reason, probably the appearance of myself or my ship, Mr. Mumpus took pity on me.

"A PEARL IS A DISEASE OF THE OYSTER"

"Come up to the house," he barked, and led the way to a rambling erection of corrugated iron and palm leaves containing, as far as I could make out, a gaping "boy" of uncertain origin, some empty soap boxes, and a microscope.

"There's nothing new in what I'm doing here," he told me over two brimming shells of coconut milk, "nothing that the Chinese have not been doing for centuries. The pearl is a disease of the oyster; introduce the disease and you will get a pearl."

"Quite," said I.

"No one has succeeded up to the present," continued Mr. Mumpus, "but there is no reason why it should not be done in time, no reason at all. I am appreciably nearer than I was a year ago, for instance. In the meantime I am producing

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THE "UPA UPA," ONE OF THE FAMOUS NATIVE DANCES OF THE SOCIETY ISLANDS

Papeete, the principal settlement of the Society Islands, is the metropolis of the southeastern Pacific, just as Honolulu is of the northeastern. It attracts as varied an assortment of humanity as any port in the world.

the ordinary blisters, or half pearls, with various foundations. You see, the cestode—"

But I cannot hope to set down here all that this amazing man told me in scientific jargon, as he strode back and forth across his mat-strewn floor.

He was a doctor by profession, had tired of it, and had come to the islands to pursue his hobby of pearl culture. He takes an oyster from the lagoon, opens it very carefully by the slow insertion of a wooden wedge, and places a pilule of beeswax against the main muscle. The mantle of the oyster then covers it with mother-of-pearl, and in the course of a few months our friend cuts from the shell a very fair imitation of a half pearl.

But, as most people are aware, the real pearl comes from the flesh of the oyster, and it is on the production of the genuine article that Mr. Mumpus centers his efforts. He breeds oysters in the lagoon and dissects them under the microscope for signs of the parasite that undoubtedly causes the pearl. He injects into the flesh of others all manner of foreign matter.

Down there on his speck of an atoll he treats the oyster as a surgeon treats an interesting case and, who knows? some day there may burst upon an astonished

XUM

Photograph by L. Gauthier

THE HARBOR OF PAPEETE, TAHITI

It was in this port that the *Dream Ship* lost its cook, the young exquisite of Cristobal. He has renounced the life of a wanderer and may be seen today presiding over the soft-goods counter of a French establishment in Papeete.

world the name of a man who can make pearls, and that name will not be Mr. Mumpus.

Chapter V

DREAM'S END

Regretfully leaving the people of the atolls, the *Dream Ship* set sail for Papeete, Tahiti, and arrived there without mishap.

A greater contrast in two groups of islands a bare day's journey apart can hardly be imagined than that between the coral reefs of the Paumotus and the cloud-capped volcanic peaks of the Societies. It is like approaching another world.

At the pass in the barrier reef a genial French pilot took charge and secured us the best berth in the harbor. Here the coral wall that forms the beach is so sheer that it is possible to make fast to the trunk of a flamboyant, as though to a bollard on a quay, and walk ashore on a gangplank, which we of the *Dream Ship* promptly did, and dined in splendor at the best hotel.

With unaccustomed collars chafing our leathern necks, and perspiring freely under the burden of clothes after a régime of towel and sola topee, we consumed iced vin rouge, poulet roti with salad, and omelette au maitre d'hôtel. Papeete was a pleasant place in that hour.

Indeed, Papeete is a pleasant place at any hour. It is the metropolis of the southeastern Pacific islands, just as Honolulu is of the northeastern, attracting as varied an assortment of humanity as any in the world.

Here we have the planter of vanilla and coconuts, the trader in anything from copra to silk stockings, the pearl-buyer, the schooner skipper, and the ubiquitous adventurer on their native heath and under conditions that make it possible for each to live and prosper.

THE DREAM SHIP LOSES ITS COOK

The French may be wrong from our iron-bound, Anglo-Saxon point of view, but they certainly have the knack of making life a more enjoyable affair under their administration than under any other at the present time.

It was at Papeete that we of the *Dream Ship* lost our cook. It may be remembered that in the Galapagos Islands, 5,000 miles back on our tracks, we rescued an exquisite Ecuadorean Government official from a delicate position by christening him "Bill" and installing him in our culinary department, where he was expected to work his passage to Australia.

He proved to be an expert cigarette smoker and little more, so that when he approached us after the first night in Papeete and intimated that he found it necessary to leave, we were neither surprised nor pained.

And so you may see to this day "Bill" of the biscuit-colored silk socks and esthetic tie, leaning gracefully over the soft-goods counter of a French store, extolling the virtues of a new line in underwear or gallantly escorting a bevy of Tahitian beauties to the movies of an evening.

"Bill" has found his niche in the scheme of things, and who can say more?

THE BENEFICIAL STREAM THREATENS TO BECOME A FLOOD

The main trouble in the Societies, as elsewhere in the Pacific islands, is scarcity of labor. Each group in this mighty ocean is struggling with the problem at the present time, and has not yet succeeded in reaching a solution.

The native will not work. He does not believe in toiling for others when he is a self-supporting land-owner himself: and, when you come to think of it, why should he?

The Pacific islands, ambitious for development, are consequently forced to turn for help to the more congested quarters of the globe, such as India and China, and herein lies the danger. The influx has already begun, and there is not a doubt that in time it will swell from a beneficial stream into an overwhelming flood, unless ultimately returned to its source by a conduit of stringent legislation.

Between the Societies and Australia, there is a regular line of steamships calling at Rarotonga, Samoa, and New Zealand, and it was in order to avoid this cut-and-dried route that we of the *Dream*

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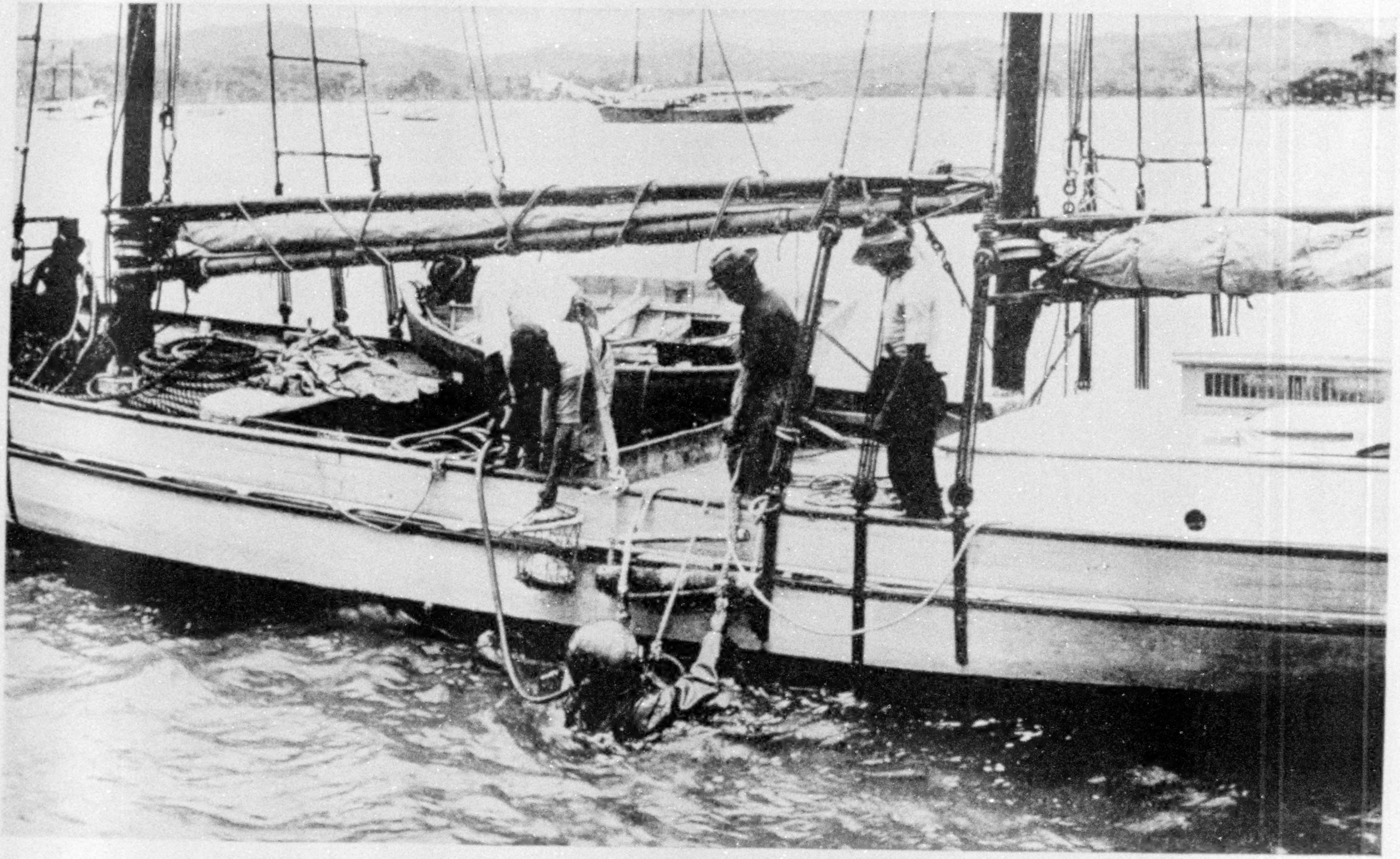

Photograph Courtesy of Charles J. Glidden

A PEARL DIVER ON THURSDAY ISLAND, OFF THE NORTHERN COAST OF AUSTRALIA

Here the undersea worker is seen incased in a diver's suit, but in the pearl fisheries of the atolls to the east the natives pluck the oysters at depths of from five to fifteen fathoms without any equipment save a network basket slung about the neck in which to deposit the shells. They remain under water as long as three minutes. The Japanese control the pearl fisheries of Thursday Island (see text, page 52).

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Ship headed for Palmerston Island, a mere speck on the chart, 600 miles distant.

LIZARD MEN LIVED ON MUREA

On the way, we called in for water at Murea, a fairy isle of fantastic volcanic peaks and fertile valleys, where legends still live. There were lizard men on Murea in the old days, it appears—an agile race of dwarfs, who lived on the inaccessible ledges of the mountain range and descended periodically on the coast dwellers, bearing off their wives and other valuables. They carried a short staff in either hand, giving them the appearance of lizards, as they scrambled back to their fastnesses where none could follow.

To prove his words, the Murean native of today will point out uniform rows of banana plants growing in clefts of rock among the clouds, the crops of the lizard men! How otherwise came they to be there? He would be a wise man who could find the answer.

Leaving Murea, the *Dream Ship* passed close to the wreck of a French gunboat piled high on the reef (page 50) as a warning to others not to tamper with coral, and stood away for Palmerston.

December to April is the hurricane season in this part of the Pacific, when the schooner skippers from Rarotonga and other places in the direct path of the cyclonic disturbance flee to the comparative safety of Papeete, and the *Dream Ship* left in April.

Luckily we escaped hurricanes, but for three days violent wind and rain squalls burst upon us, with no warning from the barometer, and we experienced the first real discomforts of the voyage.

A DELEGATION FROM "MISTER MASTERS"

Palmerston Island was a welcome sight, as welcome as it was unique. It is doubtful if such another gem adorns the earth. Neither atoll nor island, it is a perfect combination of both, a natural necklace of surf-pounded coral strung with six, equidistant, verdant islets, the whole inclosing a shallow lagoon slashed with unbelievable color.

Such was Palmerston as we approached it before a stiff southeast "trade," to be welcomed by a fleet of amazingly fast luggers and their astonished crews. "Who were we? Where had we sprung from? Had we any matches?"

To our own astonishment, the questions were fired at us in English and, what was more, English of a vaguely familiar pattern. It is a strange thing to hear one's own tongue fluently bandied among a brown-skinned people on an isolated speck of earth in mid-Pacific. But there was no opportunity of solving the riddle just then.

"Let go!" "She's set." "Lower the peak; lower the main!"

The *Dream Ship* had come to anchor on the northwest side of the reef, well sheltered from the almost eternal southeast "trades" of these latitudes, and the pilot, a six-foot figure of bronze sketchily attired in a converted flour sack, was addressing us with a courtesy as unusual as it was refreshing.

"With our permission, he would take us ashore at once. Mister Masters himself had given instructions."

PALMERSTON ISLAND, THE PLACE TO WAIT FOR THE END

The "Mister Masters himself" settled it. We tumbled into one of the luggers, tumbled out at the reef, and stood knee-deep in swirling waters, while the pilot and his crew towed their craft against a ten-knot current through a tortuous boat passage. Then aboard once more, and away at an eight-knot clip through a maze of coral mushrooms, bumping, grazing, ricochetting, until finally sliding to rest on a glistening coral beach.

"Mister Masters himself," a dignified old gentleman with a flowing white beard and the general air of a patriarch, met us at the veranda steps of his spacious home, and inside of ten minutes we were sitting down to a meal of meals.

I have Palmerston Island securely pigeonholed in my own mind as the spot of all others in which, when the time comes, to sit down and wait for the end.

The outside world, in the shape of a schooner from the Cook group, intrudes itself but once a year. The lagoon and the neighborhood islets are a mine of interest to the naturalist or sportsman, and the people have a simple charm that is all their own.

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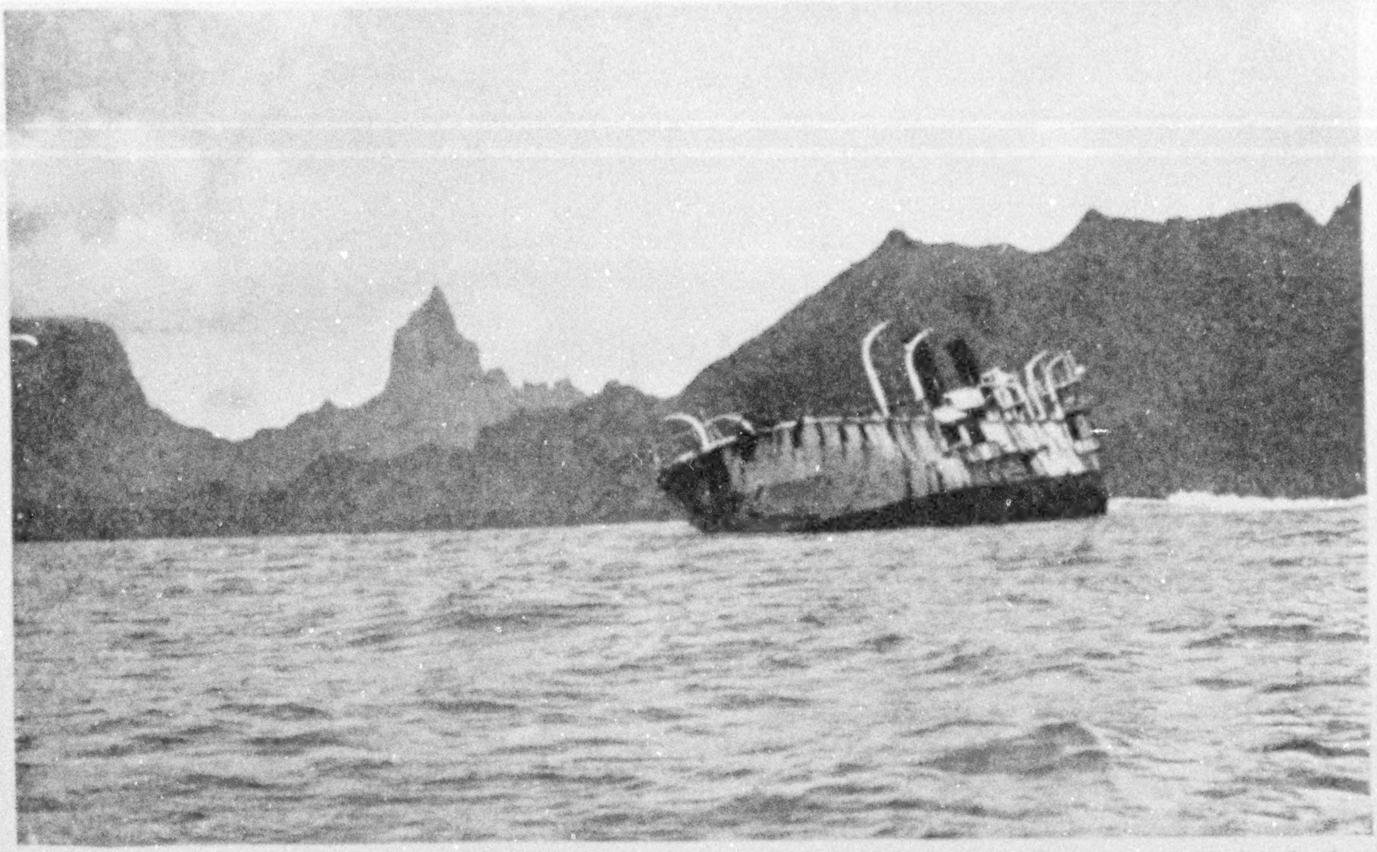

Photograph by Ralph Stock

THE WRECK OF A FRENCH GUNBOAT ON THE REEFS OF MUREA, LAND OF THE LIZARD MEN

The lizard men are supposed to have been agile dwarfs who lived on the almost inaccessible ledges of a mountain range, from which point of vantage they were accustomed to make periodical raids on the coast settlements.

Many years ago one John Masters leased Palmerston Island from the British Government and, not believing in half measures, took unto himself three native wives. By each he had a large and healthy family, which he reared in strict accordance with his own standards of social usage. That they were sound standards is evidenced in the people of Palmerston today. They read, write, and speak English, this last with an accent vaguely reminiscent of the southwest of England. They are courteous, hospitable, and honest to a degree nothing short of startling, these days, and although naturally inbred, they do not show it, either mentally or physically.

One thing alone troubles the John Masters of today. To whom do he and his island belong? The war has changed all things. The Cook group, of which Palmerston has been declared a far-flung unit, is administered by New Zealand. Is "Mister Masters himself" to be taxed, governed, and generally harried by a people who hardly existed when his father took over Palmerston. It looks like it.

Au revoir, little island. Some day in the not-very-distant future a decrepit, irritable old man will return to your hospitable shores in search of peace, and if you are then as you are now, which Heaven send! he will assuredly find it.

We of the *Dream Ship* had no large-scale chart of the Tonga group, our next port of call; so that when we sighted the island of Tonga Tabu at dusk, two weeks later, we hove to and waited for dawn. Even then two more days and nights elapsed before we had found the Eastern pass through the maze of reefs that surround the island of Tonga Tabu, and hove to in the passage awaiting a pilot.

We could see his station and flagstaff on a sandy islet, but no flag in answer to our own. We waited and continued to wait, while a four-knot current carried us up the ever-narrowing channel to within fifty feet of the coral bar at its end. And then it was that the motor auxiliary that I have so consistently reviled throughout these pages vindicated itself by saving the *Dream Ship* from certain destruction. It went! Literally

XUM

inch by inch it fought the current, and continued to fight it for the hour or more we were obliged to wait on the pilot's pleasure.

Something ought to be done about those passes into Tonga Tabu. The pilot does not know the difference between an international code signal and a burgee, so he admitted when he had clambered aboard and allowed his canoe to float away on the tide.

"I didn't know who you were," he apologized. "Thought you might be a local trading cutter."

There are moments too full for words, and this was one. In stony silence he steered us through the most fearsome network of reefs we had yet encountered, and the *Dream Ship* was soon made fast to a buoy not twenty yards from Nukulofa wharf.

A SINISTER FIGURE BOARDS THE DREAM SHIP

It was here that the port doctor boarded us, in company with a genial gentleman, who, if I had known then what I know now, would never have set foot aboard. He said very little until later in the day, when I met him at the cosy Nukulofa Club.

"Do you want to sell that boat of yours?" he asked me.

"No," said I.

"Will you sell her?" he corrected himself.

"Not for what any sane man would be inclined to pay," I told him.

"And what is that, may I ask?"

More as a jest than anything else, I named a figure sufficiently preposterous to raise a laugh from most people. But the genial gentleman did not laugh.

"You would take no less?" he suggested gravely.

"Not a cent," said I. "As a matter of fact—"

"I suppose a draft on —— will satisfy you?"

"What's that?" I stammered.

"I'll take her," said the genial gentleman. "I was saying that—"

But I heard no more. I had sold the *Dream Ship!*

Confession is said to be good for the soul, but I have not noticed much improvement in the state of my own since making the above statement. Imagine parting for pelf with a home that has conveyed you across twelve thousand miles of ocean; or, better, try to imagine selling your best friend, and you have some idea of my feelings since the transaction.

THE DREAM SHIP VANISHES IN A COMMERCIAL TRANSACTION

There was no going back on it. I have not the moral courage for such deeds. The draft lay on the table before me. I had a pocketful of money and no ship. I have never been more miserable in my life.

It took me the best part of an hour's aimless wandering over the powdered coral roads of Nukulofa to summon the necessary courage to break the news to the crew of the *Dream Ship*, but by the end of that time I had some sort of scheme evolved.

Between Tonga and Australia there were no islands of particular interest, anyway. We would continue our journey by steamer—it would be a pleasant change—and in Australia I would invest my ill-gotten gains in a far more magnificent vessel than the *Dream Ship*.

On this "more magnificent" craft we would carry out our original program of cruising up the Queensland coast to the islands of the northwest Pacific, and so home via Java, Colombo, and the Suez, thereby avoiding the monotonous passage between Tonga and Australia.

Rather clever, I thought.

Nevertheless I prefer to draw a veil over the communication of this brilliant scheme to the rest of the crew. It is enough that we took our departure by steamer according to schedule and without daring to look back on the good ship we had left behind.

We then proceeded to rub shoulders with a horde of fellow-passengers, who no doubt regarded us as unattractive as we regarded them; to consume beef tea at 11 o'clock, and push lumps of wood about the deck with a stick for want of something better to do.

A VAIN SEARCH FOR ANOTHER SHIP

In Australia I went in search of the "far more magnificent ship," yet one

HOUSE-BUILDING IN TONGA

It was here that the master of the *Dream Ship* said farewell to his craft.

which must be small enough to be handled by a crew of three and sufficiently staunch to withstand anything.

I found a country struggling with the same problems that vex the rest of the world at the present time, yet possessed of potential resources and a cheery assurance; but I found no ship.

I journeyed to New Zealand, and there beheld a prosperous, immensely earnest people, encumbered about much sheep-raising, dairying, and over-legislation both at home and in their newly acquired territory in the South Pacific; but I beheld no ship.

I scoured the Queensland coast all the way to Thursday Island, where the Japanese are permitted to carry off the major part of the profits from bêche de mer (a sea slug which makes the most nutritious soup in the world), pearls, pearl shell, and trocas shell (second only to mother-of-pearl for the manufacture of buttons, etc.) for the simple reason that the majority of Australians cannot be induced to leave their pet city and tackle the industry; but still I found no ship.

And so the heart is gone out of things. The dream is ended.

TREASURE-HOUSE OF THE GULF STREAM

The Completion and Opening of the New Aquarium and Biological Laboratory at Miami, Florida

By John Oliver La Gorce

Author of "Devil-fishing in the Gulf Stream," "A Battle-ground of Nature: the Atlantic Seaboard," "Pennsylvania, the Industrial Titan of America," etc.

NO LONGER can the land animal kingdom of the earth and its peculiar relation to mankind be called a mystery, for painstaking scientists and intrepid hunter-explorers through the centuries have penetrated to the remote places of the world and brought back to civilization minute accounts of the habits and characteristics, the skeletons and skins, as well as living specimens of wild animal life. As a result, we find that today only at rare intervals is a new and distinct species of quadruped or biped made known to us.

Our knowledge of the denizens of the deep is another story. In this department of zoölogical research, however, though the recognized species have increased from fewer than 300 to more than 12,000 within less than two centuries, there are numerous varieties yet to be recorded, many more to be studied, and large areas rich in marine fauna still to be explored scientifically for the common good of mankind.

Since the dawn of human history, man has studied land animal and bird life—in fact, he now knows much of prehistoric creatures long since extinct.* But the "waters under the earth" still hold countless fascinating secrets which challenge the ichthyologist, who pursues a branch of science pertaining to the study of fish life only a few hundred years old, with a world of sub-sea life to conquer, especially among the warm waters of the semi-tropic regions.

THE PART THE POOR FISH WILL PLAY IN A WORLD PEACE

This challenge now has a mighty urge, in that a mounting population faces a dwindling pro rata food supply, and must turn to the sea, as its primitive ancestors once did for an entirely different reason, if it would assuage its hunger and avert the national "land hunger" which is a potent stimulus to war. In the light of a better realization of the economic causes of wars, it is not stretching the imagination to say that he who discovers a new food-fish supply is an apostle of future peace.

Once more, as in its other natural resources, the United States of America is favored among nations. Paralleling our eastern coast for hundreds of miles, the Gulf Stream, that mightiest river of the ocean, which sweeps northeastward with such giant force to turn back the icy waters of the Arctic from our shores, performs another and less widely recognized service in depositing upon America's southeastern threshold a gift of fishes which some day may be regarded as providential, if not miraculous. Indeed the map-minded person might even picture a peninsular hand, in the shape of Florida, reaching out to receive this boon, nourished in the warm waters of the kindly current.

The Gulf Stream is, in truth, a happy hunting grounds for scientist, amateur angler, and professional fisherman. In its waters there have been found some six hundred varieties of fishes, composing practically one-fifth of the entire fauna of the American continent north of Panama.

The most southerly city on the Florida mainland is Miami, nestling beside the limpid waters of Biscayne Bay, separated from the ocean by a peninsula which completely protects the city from the lashing of an angry ocean during seasonal storms. At Miami Beach has been constructed an aquarium and biological laboratory (latitude 25 degrees 46 minutes north and longitude 80 degrees 7 min-

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*See "Hunting Big Game of Other Days," by Barnum Brown, in the May, 1919, National Geographic Magazine.

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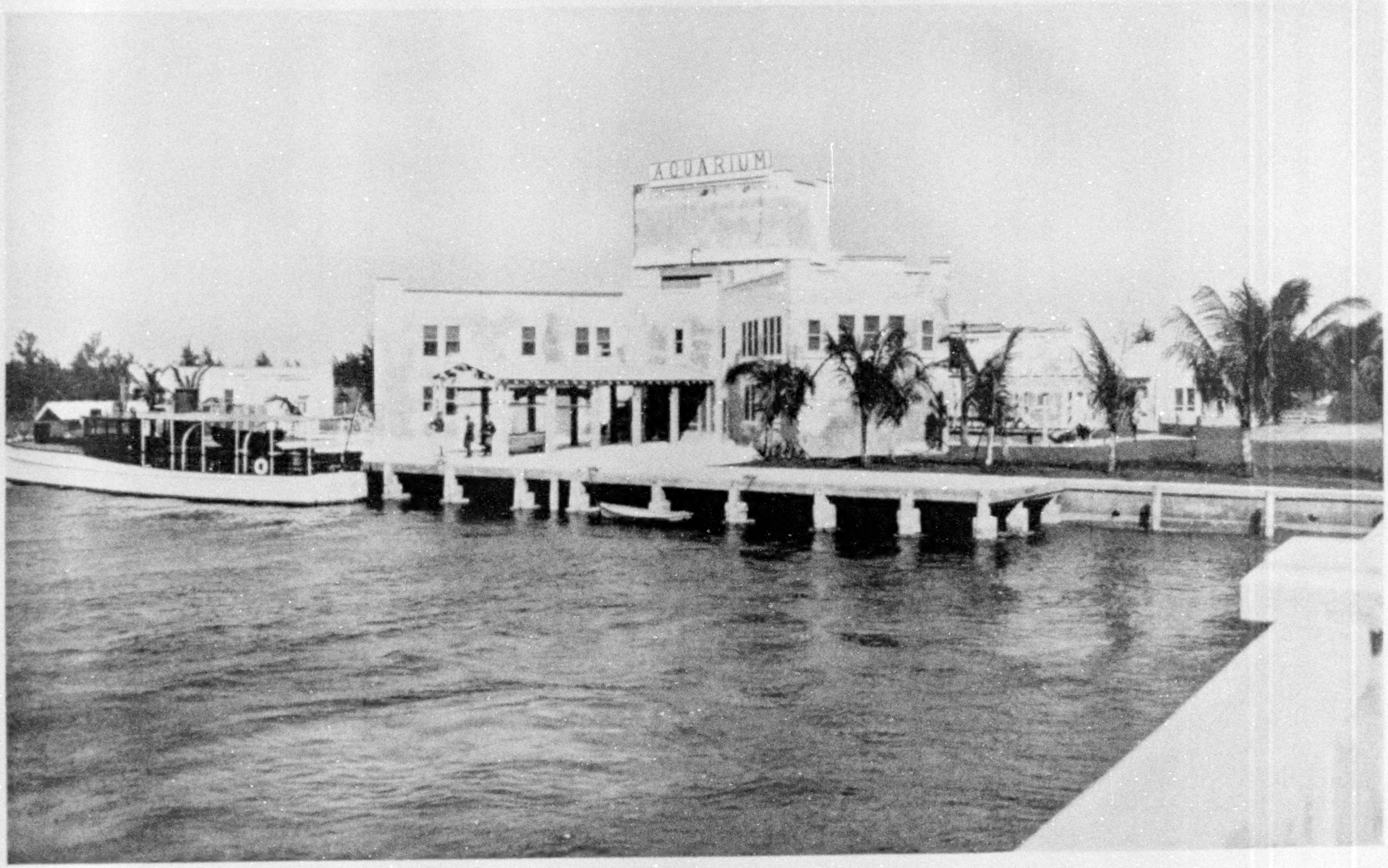

THE AQUARIUM BUILDINGS FROM BISCAYNE BAY: MIAMI BEACH, FLORIDA

The Biological Laboratory is located in the right wing of the building. The Aquarium grounds and gardens are being rapidly developed, and already contain numerous varieties of beautiful palms and sub-tropical flora. One of the Aquarium collecting boats is moored to the dock.

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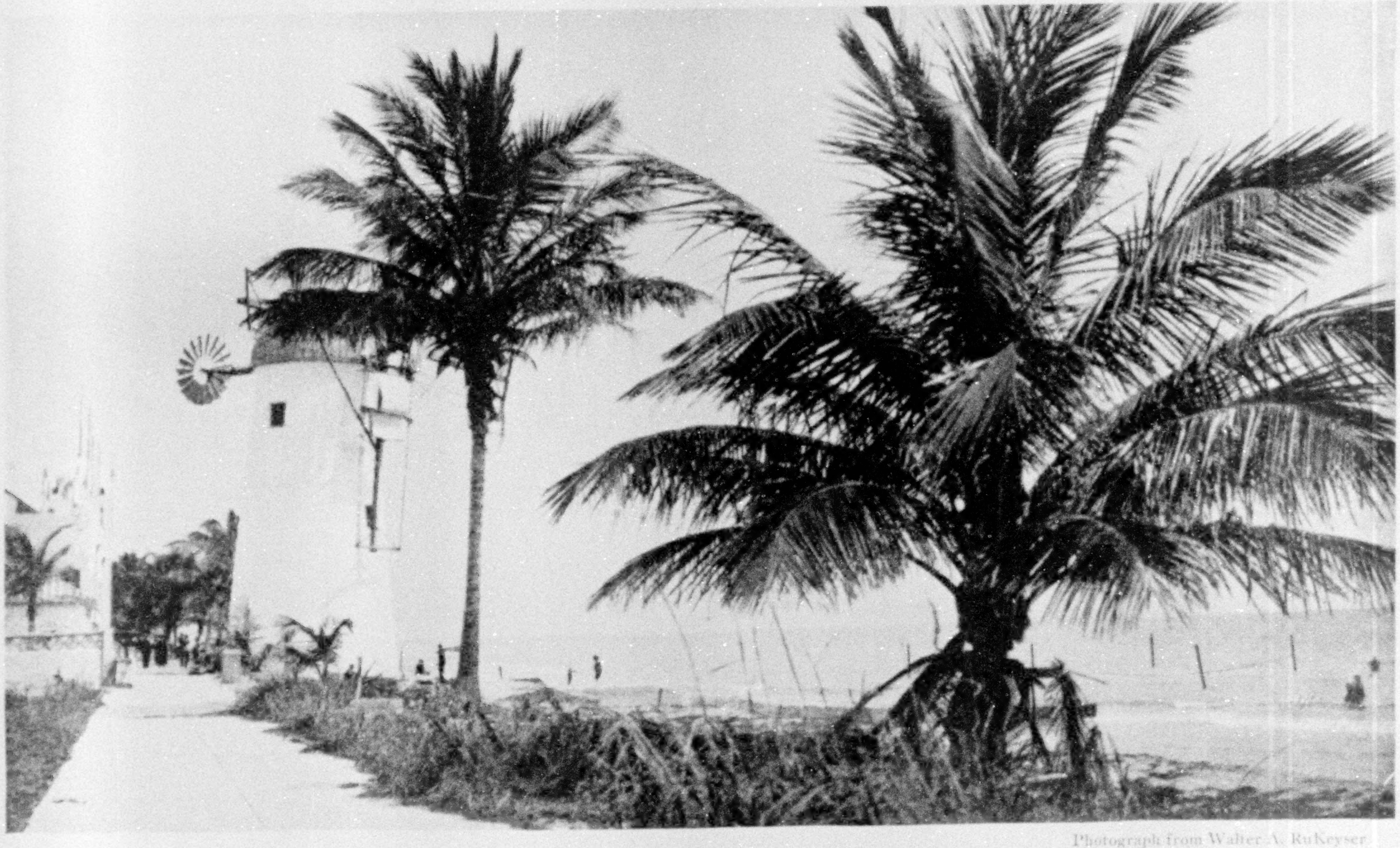
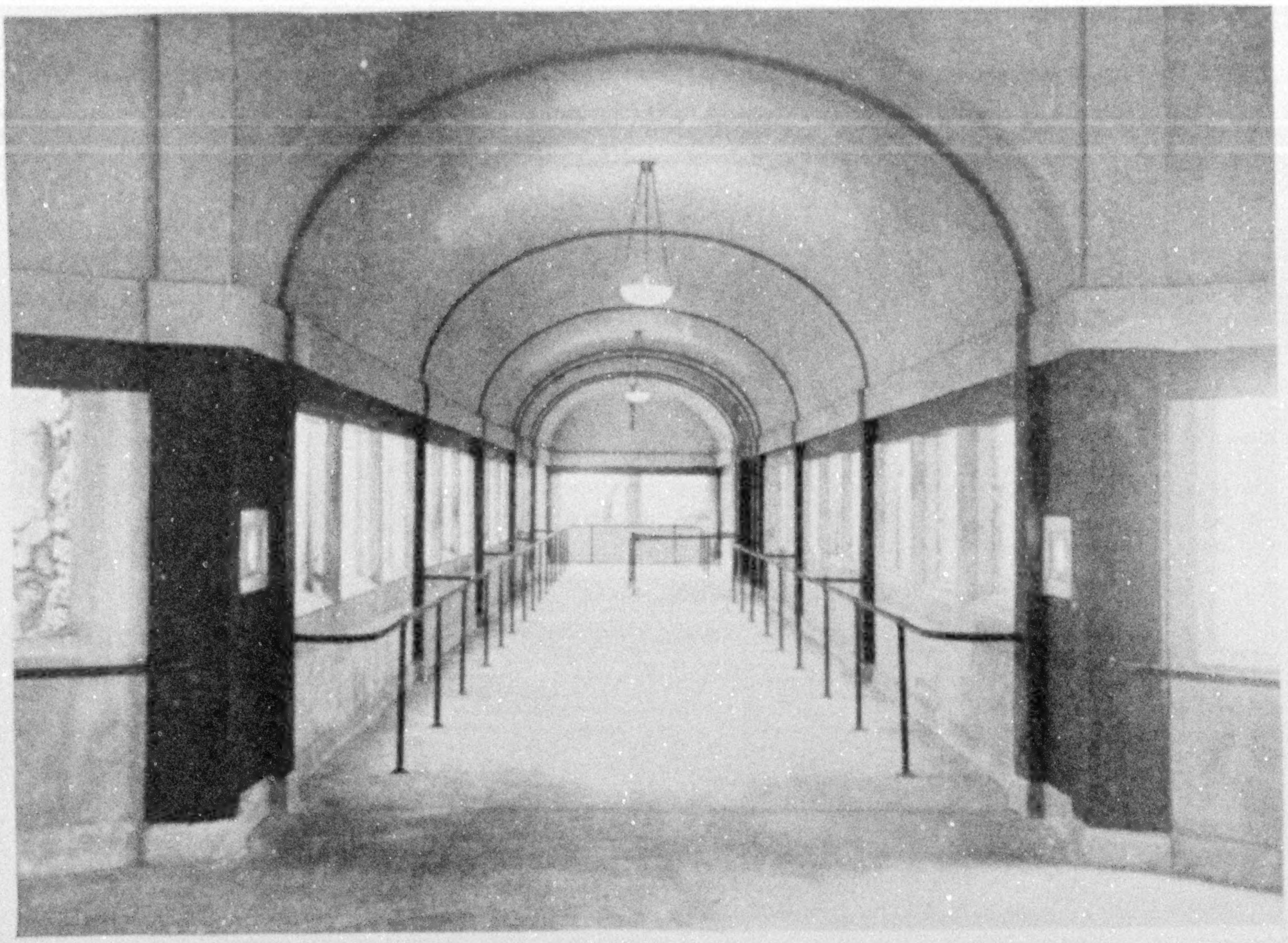


Photograph from Walter A. RuKeyser

THE WINDMILL AND CASINO, MIAMI BEACH, FLORIDA

The waters of the Gulf Stream itself lave the shores of Miami Beach and afford delightful bathing the year round. The Aquarium and Biological Laboratory is situated near by.



ONE OF THE EXHIBITION CORRIDORS: MIAMI AQUARIUM

The interior of the Aquarium building is especially designed for the best arrangement and grouping of the fifty large tanks in which the hundreds of unusual and gorgeously colored fish can be seen and studied by the visitors. During the day the only illumination within the corridors is the sunlight, which enters from skylights directly above each tank, and the light thus diffused through the sea water within the tanks creates a very realistic atmosphere of the ocean's depths.

utes west), which, because of its ideal location and equipment, will take rank with the great aquariums of the world.

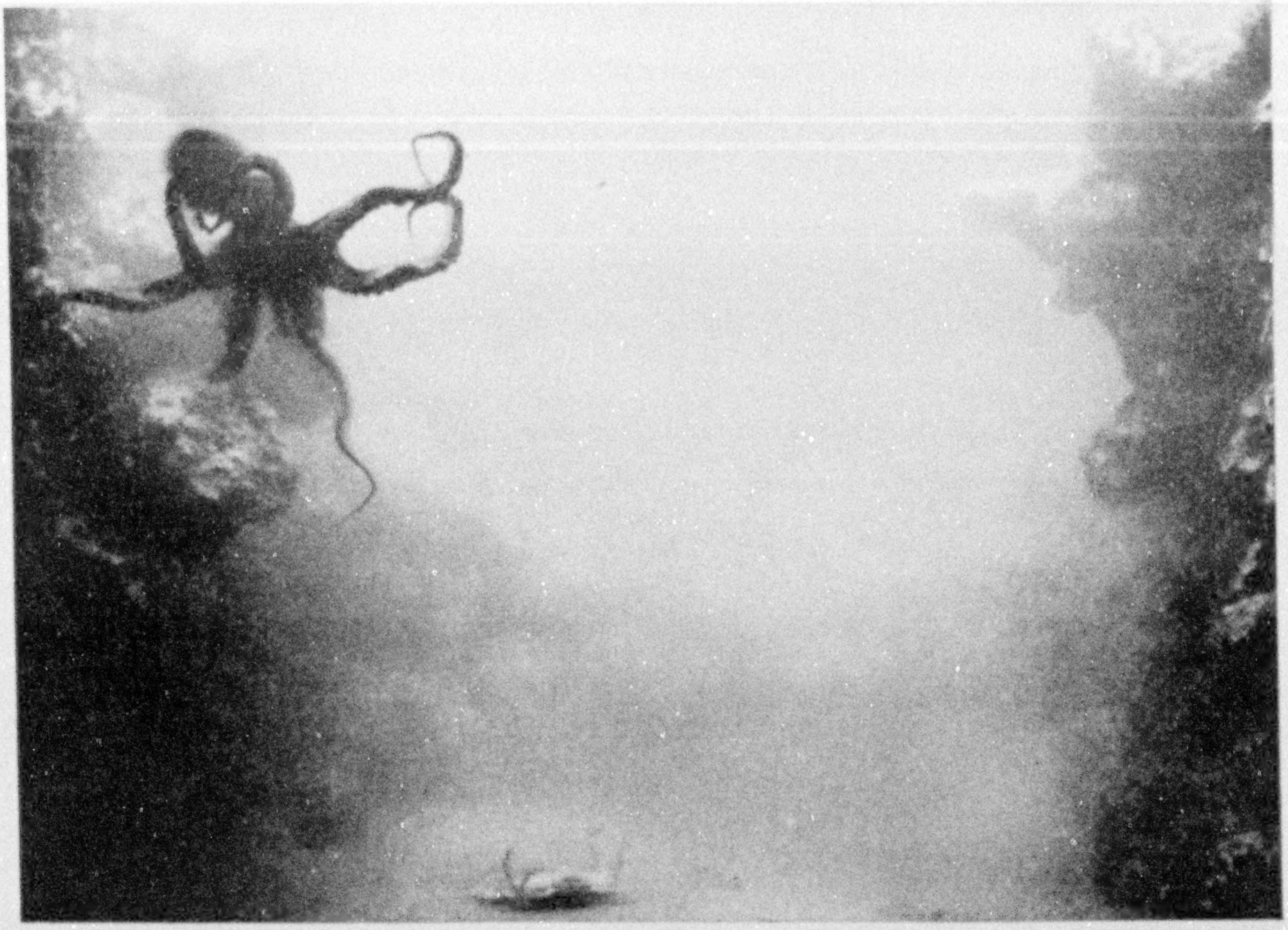
HUMAN INTEREST IN THE QUICK

Humankind takes a deep interest in animate things, and fish seem to have a peculiar and potent appeal to man. The child turns from toy and pet to gaze upon goldfish in a tiny bowl; the adult will sit by stream or in a boat by the hour in the hope of landing a "string." Angling, in fact, makes the whole world related. It is one of the few sports that knows no flag nor race.

A striking proof of this interest is manifested in the fact that each year the visitors to the New York aquarium, located on the tip of Manhattan Island, are twice as many as those who go to the more conspicuous and accessible Metropolitan Museum of Art on upper Fifth Avenue.

May the reason of this fascination not be the racial memory of that far-gone time when our remote ancestors, still too primitive to invent weapons to give them sure advantage in hunting wild animals, turned to stream and ocean inlet for a palatable, abundant, and ever-ready food supply?

The wonder is that science, which has been defined as "intelligent curiosity," should have waited so long to turn to that field which offers a vast, unexplored content of animal creation. That Protean observer, Aristotle, studied fish life, but from his day nearly twenty centuries intervened before the Swedish savant, Peter Artedi, "Father of Ichthyology," met an untimely death by drowning in a Holland canal, but left enough notes of his observations to enable Linnæus to publish them (in 1738), and thus establish a starting point for modern study of genus and species.



AN OCTOPUS IN ONE OF THE MIAMI AQUARIUM TANKS

The octopus is a source of fascination to most people in spite of its repulsive appearance. It has a large, ugly head, a fierce-looking mouth armed with a pair of powerful, horny jaws shaped much like the beak of a parrot, and topped with two diabolical eyes set close together that can send forth a demoniac glare when angry. The grotesque head is mounted on a somewhat oval body from which radiate eight arms usually united at the base by a membrane. The arms, or tentacles, are provided with rows of suckers with which to clasp and cling to its prey with uncanny strength and quickness. The octopus has the faculty of instantly changing color before the very eyes, and is constantly doing strange and weird things, which always attract the attention of the passer-by.

Twice fish figured importantly in our national life. The inland stranger who visits Boston may smile at the "sacred codfish," which is so conspicuous in the decoration of the State House; but a study of the Bay State's early history will impress every American with the major part fishing played in the industrial history of his country. Moreover, the prominence of fish food in the conservation program that helped toward a glorious victory in the World War is a matter of recent memory.

THE ECONOMIC SIDE OF THE STUDY OF MARINE FAUNA

Now there is not only the food problem urge to impel scientific study of fish, but many other fish products, such as cod-liver oil, menhaden oil as a linseed-oil substitute in paint manufacture, seal oil for miners' lamps, and the possibilities of fish guano as fertilizer, fish meal as cattle food, shark skin for leather, and fish oil for glue, to warrant a closer scrutiny of the industrial uses of fish.

Popular interest and industrial possibilities are two reasons why humanized geography is such a compelling subject. The Miami Station not only will afford visitors an opportunity of getting a bird's-eye view of the little-known life forms of ocean depths, but it will offer unique opportunity for scientific observation and study of these sub-sea citizens.

It is difficult to transplant and keep alive the denizens of the warm seas, for they do not take kindly to the colder waters of the north; therefore, to exhibit them successfully, not only must clear

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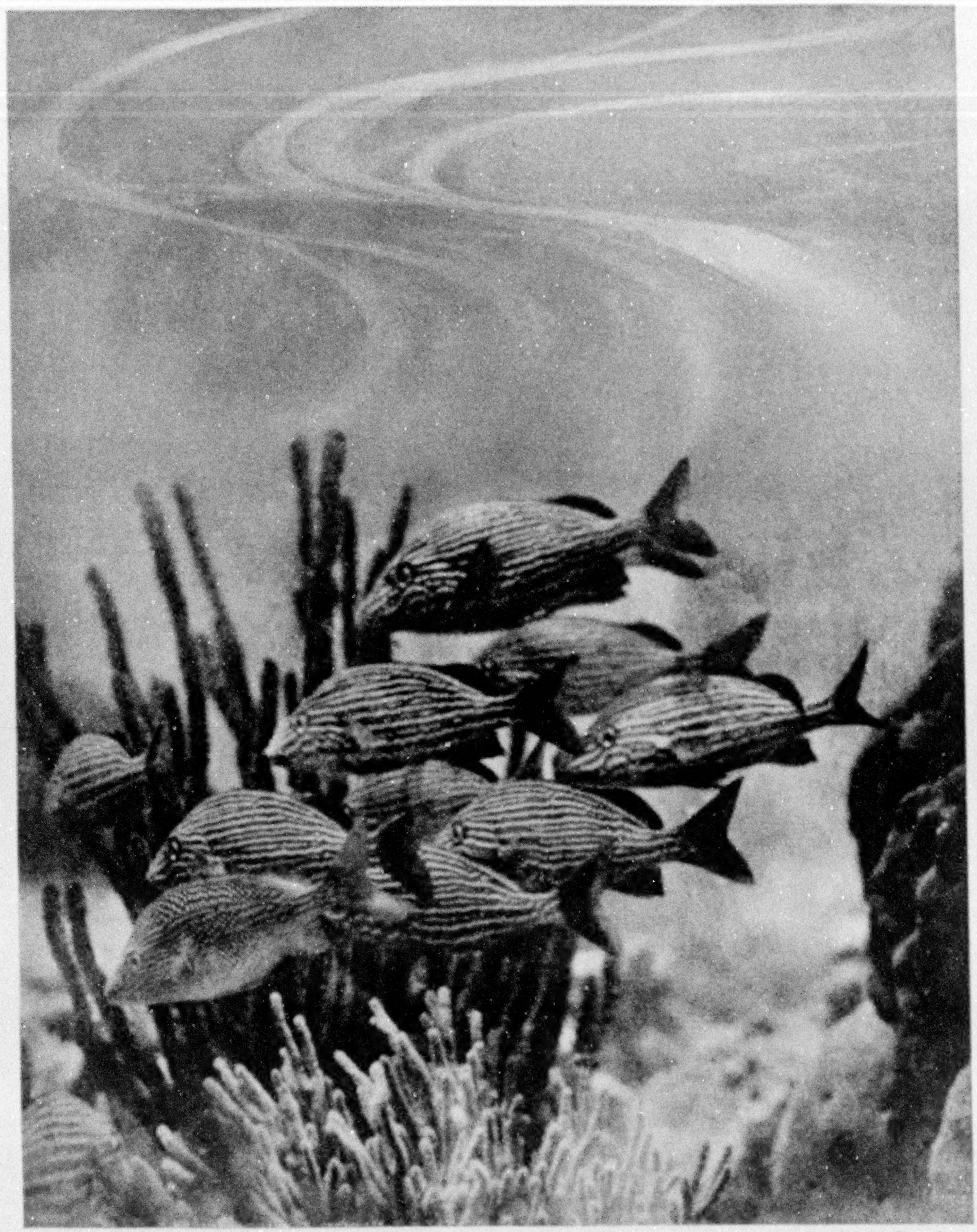

Undersea Photograph by Dr. W. H. Longley

UNDERSEA STUDY OF A FAMILY GROUP OF YELLOW GRUNTS

To realize the full value of this amazing photograph, one must remember that these multihued fish are at home among the coral and sea-fans of their natural habitat, many feet beneath the surface of the Gulf Stream. The yellow grunt is one of the species of fishes which makes a croaking or grunting sound, a fact from which it derives its name. A distinguishing feature of this fish is its bright red or orange color at the base of the jaws and inside the mouth. The color patch is revealed to its fullest extent when the mouth is opened wide in the presence of an enemy, or when it invites the services of the butterfly fish to enter between its jaws and extract certain parasites attached to the walls of its mouth (see Color Plate VII).

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and uncontaminated salt water itself be transported from miles out in the ocean to the tanks of the city aquariums in the north, but the water must be kept heated the year round to the proper temperature of their southern habitat.

More fortunate is the Miami Aquarium, which is located within a few hundred yards of the outlet of Biscayne Bay into the old Atlantic; for it has salt water from the Gulf Stream itself available for changing in the tanks at every turn of tide, if necessary, and there is no necessity for artificial heating all year around, as the water is never below 63° F. in winter nor above 85° F. in summer.

THE MIAMI AQUARIUM HAS EXCEPTIONAL EQUIPMENT

The Miami Aquarium is equipped with fifty exhibition tanks, each with a visible area of 4 x 6 feet. One of the glass-front tanks is 36 feet long, 15 feet in width, and 10 feet deep—probably the largest display tank in the world. In it may be shown fish up to 12 feet in length. The exhibition tanks are arranged along corridors, in the general form of a Maltese cross, with a central rotunda.

The only light is that admitted from skylight openings directly over each exhibition chamber, so that the sun's rays filtering through the waters of the tanks give the interior of the aquarium the atmosphere of the ocean bottom itself, and the multihued and wonderfully beautiful fish citizens of the tropics stand out in their regal colors and without the optical distortion which arises from artificial illumination against glass. To further create the atmosphere of the natural habitat of these fish, the tanks are lined with coral rock and festooned with living specimens of the wondrous flora of the ocean bed.

This plant life also is needful to make the captured specimens feel at home in their new environment, and, with such peaceful and customary surroundings, most of them soon become domesticated and seemingly unaffected by their transplanting. Indeed, they are relieved of the burden of the high cost of living and are even willing to give up their pursuit of prey, since their natural food is supplied at regular intervals.

Most people who live far from the subtropic seas, especially those in inland America, have little conception of the wondrous beauty of the colored fish of our southern waters.

FISH TINTS THAT CHALLENGE THE RAINBOW

Elsewhere in this number will be found a series of four-color reproductions of life portraits of some of the more common of these richly colored specimens. These studies (see Plates I to VIII, pages 61 to 68) were made by a noted artist, who watched the fish within the tanks of the aquarium day in and day out, studied their color phases, and the ability of many of them to change their tints and hues, as does the chameleon, until he was able to transfer a suggestion of their rainbow coloring to the canvas.

To the student of ichthyology, the completion and opening of the Miami Aquarium early in January, 1921, will be an occasion of moment, for this station is the only one of any size on the entire South Atlantic seaboard, and is located but twelve miles from the axis of the Gulf Stream.* The Biological Laboratory, equipped with tables for individual or class use, offers opportunity for the scientist and student to pursue these engrossing studies with every convenience of supply and equipment and with their study subjects ever available under most favorable conditions. The institution will specialize in the investigation of the migration of food-fish and the artificial cultivation of the spiny lobsters, stone crabs, et cetera.

Instead of having to go to the great Italian station at Naples, or the Museum of Oceanography at Monaco, students of fish life will be offered the facilities outlined, in their own country, for our own subtropic waters have all that the Mediterranean affords and much besides.

THE PERSONNEL OF THE AQUARIUM

The director of the Miami Aquarium, Mr. L. L. Mowbray, has acquired an extensive knowledge of warm-sea fish in studies extending over many years. He

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*See "The Grandest and Most Mighty Terrestrial Phenomenon: The Gulf Stream," by Rear Admiral John E. Pillsbury, in the NATIONAL GEOGRAPHIC MAGAZINE for August, 1912.

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built and had charge of the aquarium at Bermuda and, after developing that to its full possibilities, was associated later with the work of the Boston and New York aquariums.

Mr. Mowbray has had charge of the installation of the complicated tanks and interior equipment of the Miami Aquarium and, with his assistants, already has obtained from every available nook and hiding place among the Florida Keys and the Bahamas more than 2,500 fish specimens for exhibition purposes. These range from the lordly tarpon to the gentle angel-fish. In the aquarium grounds are open tanks in which are sea-cows, otters, and alligators.

FOOD VALUE OF WARM-WATER FISHES TO BE ESPECIALLY STUDIED

The president of the Miami Aquarium Association is Mr. James Asbury Allison, whose great interest in sport fishing brought about a desire to make available a laboratory where investigations might be carried on concerning the food value of warm-sea fish, and thus enlarge the food supply of the country.

One of Mr. Allison's desires is to develop practical data concerning the food worth of certain fishes at different periods of the year. For example, it will be valuable to housewives to know that a mullet at six cents a pound may be, during certain months, because of what it eats during that time, as valuable in food content as the halibut or sea bass, which cost four times as much, and can be prepared for the table in an equally appetizing manner. Not only will the aquarium seek information of this character through scientific study, but, having ascertained the facts, it will place them at the disposal of the public in popular, understandable form.

FIRST OF THE AQUARIUM EXPEDITIONS FINDS A FLAMINGO COLONY

Already the Miami Aquarium has achieved a success in sending an expedition to Andros, the largest, but least known, of the Bahama Islands, to relocate the most beautiful of the larger birds of the world, the glorious flamingo, once indigenous to Florida, but which no longer exists on the American continent—indeed, it is making its last stand in the New World on this island in the Bahama group.

The party of naturalists, ornithologists, and artists, after weeks of effort in the tidal swamps and uncharted bayous, finally located the flamingo colony and collected valuable data.

Upon the return of the expedition to Nassau, permission was given by the colonial government to bring back to Miami a sufficient number of the birds for propagation purposes, and they will be located in a giant aviary on the beautiful shores of Flamingo Bay, only three miles from the aquarium buildings. It is hoped that in this natural habitat the birds will reacclimate themselves and multiply in large numbers, so that they may once more take their place in the natural history of the United States.

A method by which the aquarium intends to popularize the study of fish life will be by making motion pictures of the peculiar habits of fish, of their movements in the water, and their ability to take on a protective coloration when frightened or otherwise disturbed. Motion pictures also will portray the hatching of eggs, the development of the spawn by its natural instincts, showing its efforts toward self-preservation and desire to escape the fate that constant warfare in the seas portends.

EMINENT AUTHORITIES ON NATURAL-HISTORY SUBJECTS AMONG ADVISERS

Carl G. Fisher is Vice-President of the Association, John Oliver La Gorce, Secretary and Treasurer.

The advisory committee is composed of Alexander Graham Bell; Gilbert Grosvenor, President of the National Geographic Society; Dr. Barton W. Evermann, President of the California Museum of Science; Henry Fairfield Osborn, President of the New York Zoölogical Society; Dr. Hugh M. Smith, U. S. Commissioner of Fisheries; Thomas R. Shipp; Dr. David Fairchild, agricultural explorer; Dr. Charles H. Townsend, Director of New York Aquarium; Dr. Charles D. Walcott, Secretary of the Smithsonian Institution; Dr. Carl H. Eigenmann, of the Indiana University; Dr. E. Lester Jones, Director, Coast and Geodetic Survey, and other well-known naturalists.

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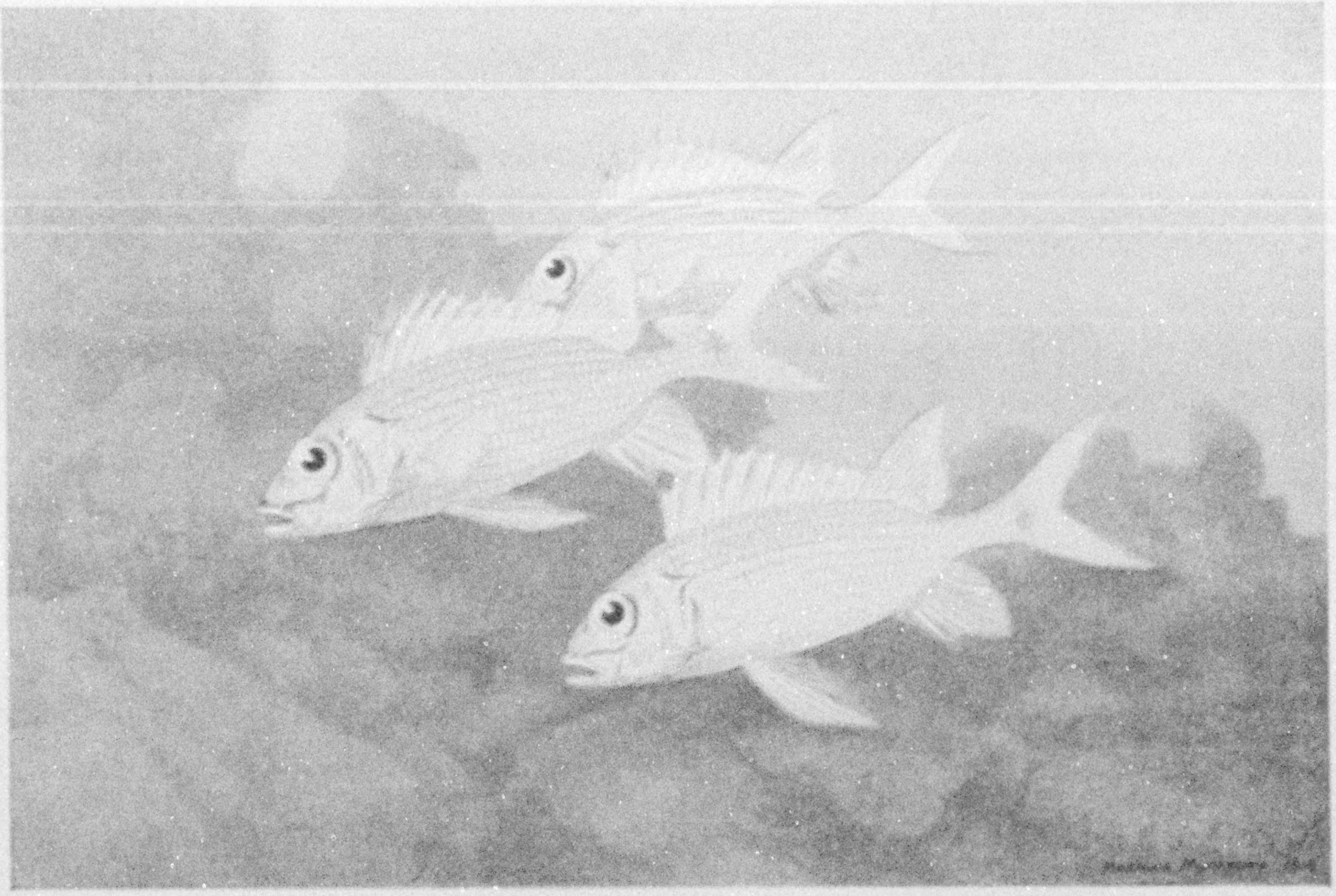
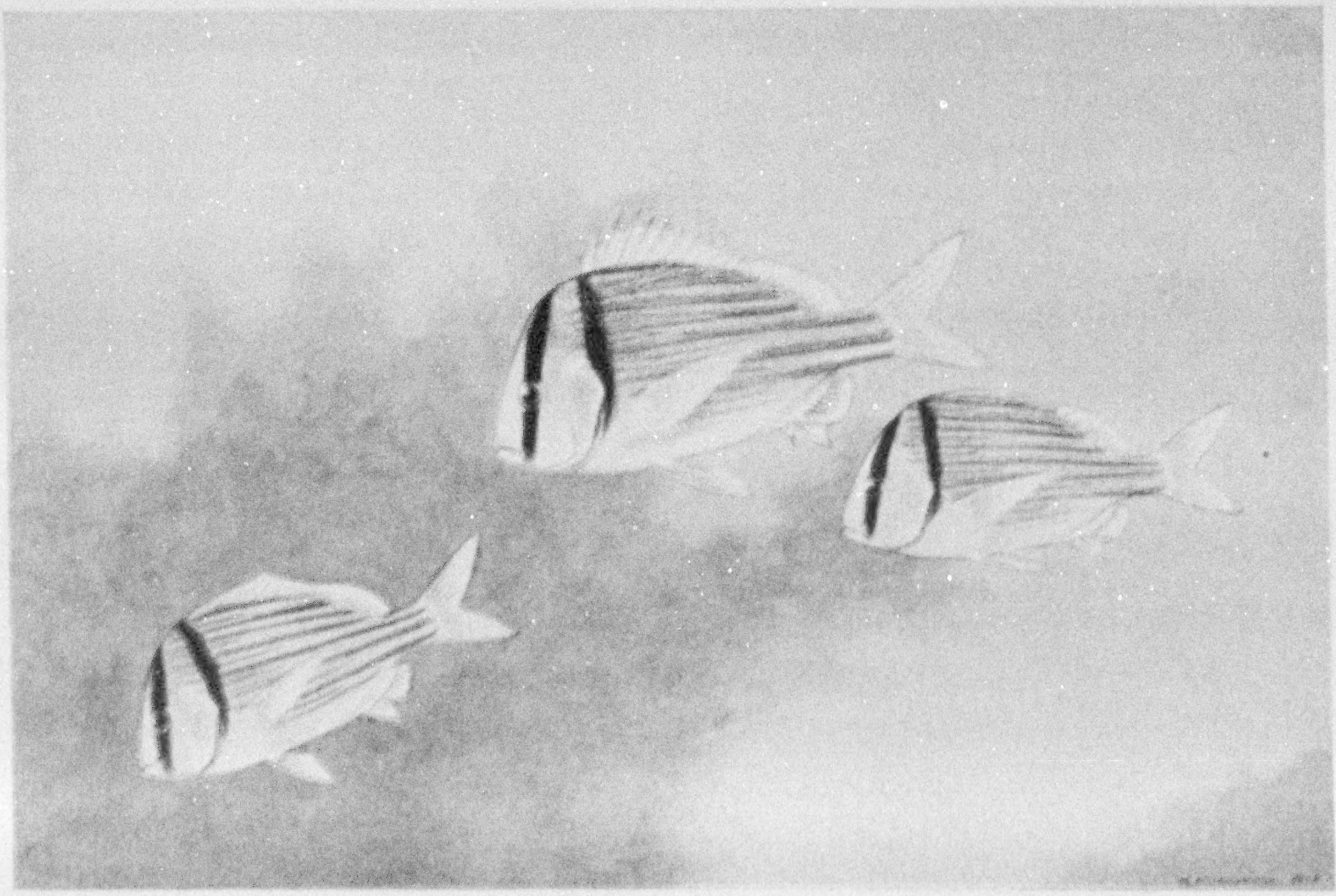


THE SQUIRREL FISH OR SOLDATO (*Holocentrus ascensionis*)

These bright hued habitants of the tropical seas are to be found in the waters surrounding the Bermudas, Florida, the West Indies, St. Helena and Ascension Island. They reach a length of two feet, and are considered a good food fish.



THE PORK FISH (*Anisotremus virginicus*)

This important food fish, found from Florida to Brazil, reaches a length of fifteen inches, and lives in large numbers about coral heads and reefs. It is easily trapped by market fishermen.

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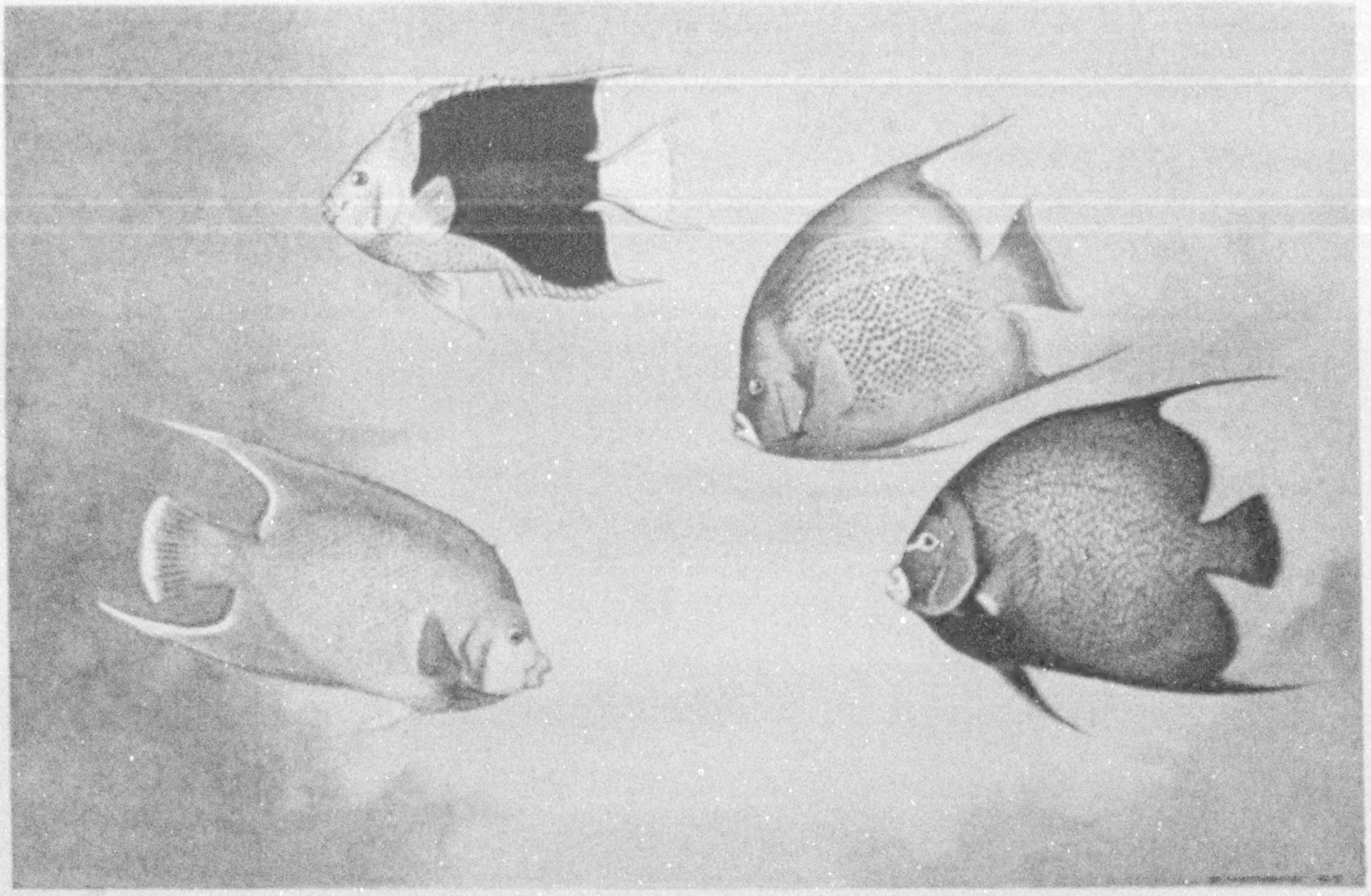
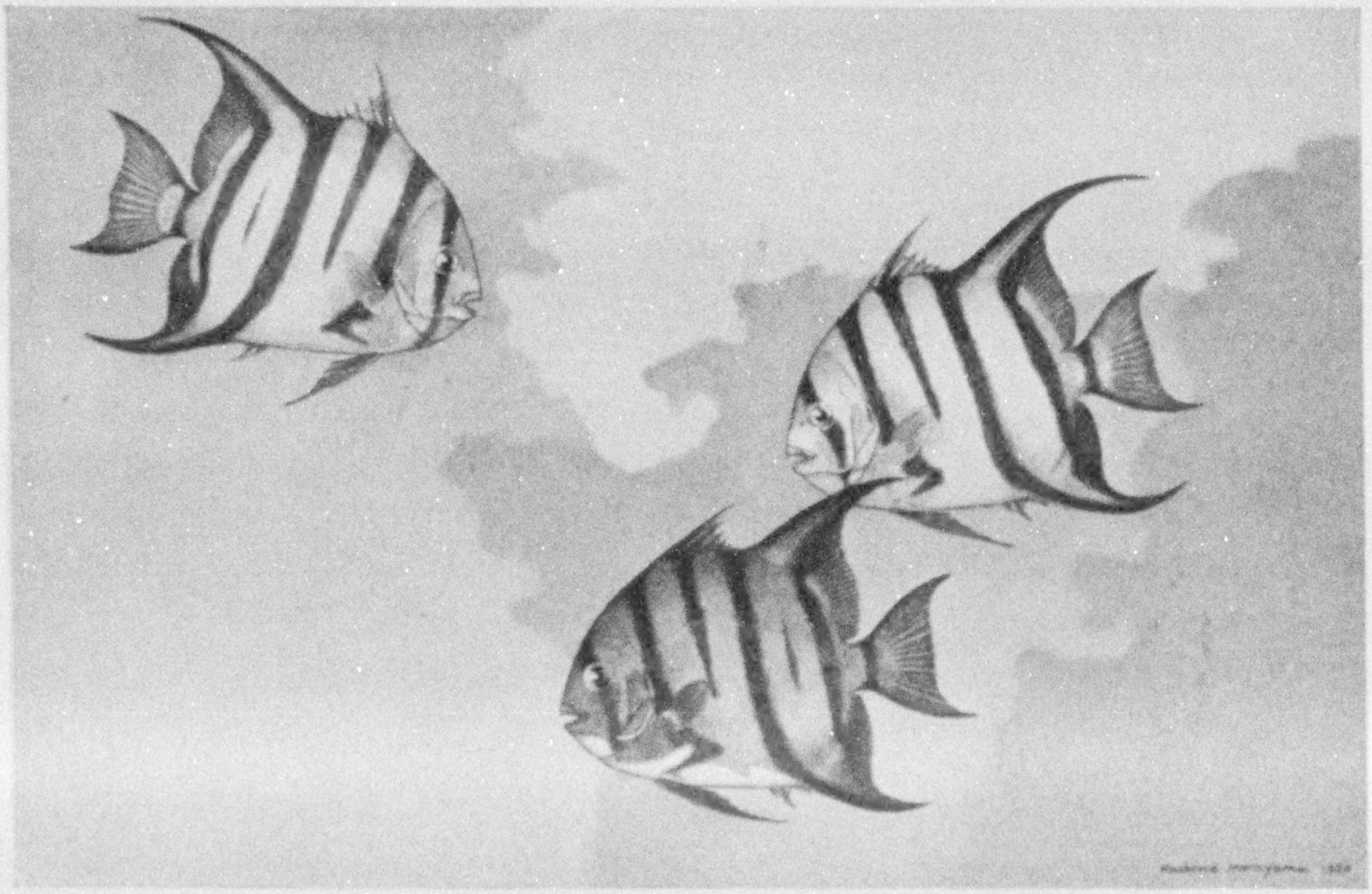


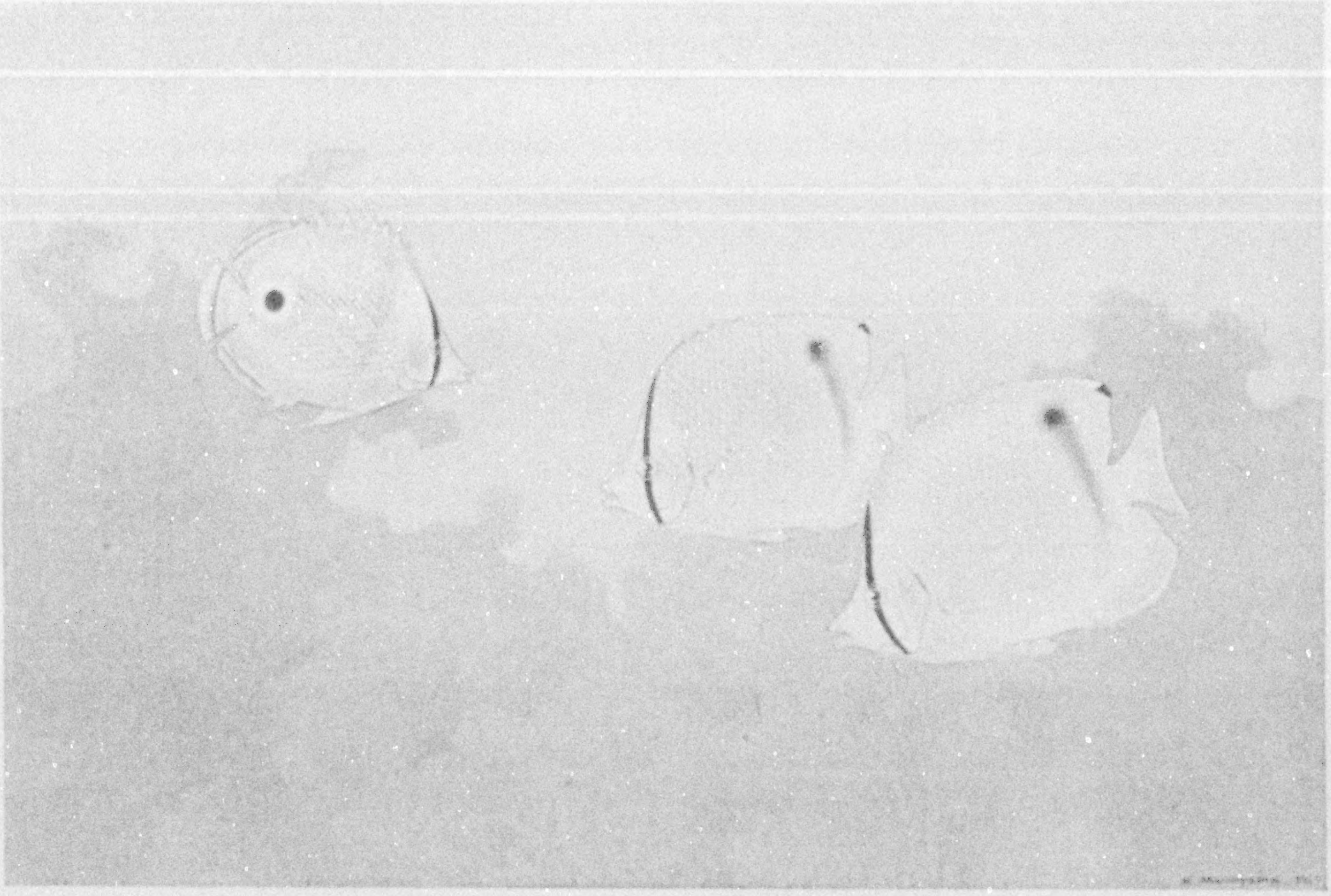
FOUR RESPLENDENT TYPES OF ANGEL-FISH

The Blue Angel-Fish (*Angelichthys isabelita*), shown at the lower left, feeds chiefly on crustaceans, and lives among the coral reefs of the Florida Keys and the Bermudas. The Black Angel-Fish (*Pomacanthus arcuatus*), shown at the upper right, is found from New Jersey, through the waters of the West Indies and as far south as Bahia, Brazil. It is one of the most beautiful of reef dwellers. The French Angel-Fish (*Pomacanthus paru*), shown at the lower right, is found from Florida to Bahia, and reaches a foot or more in length, but is not considered a good food fish. The Rock Beauty (*Holacanthus tricolor*), upper figure, is rarely found in Florida waters, but swims as far south as Bahia. It lives in the deeper parts of coral reefs, and is most difficult to trap.



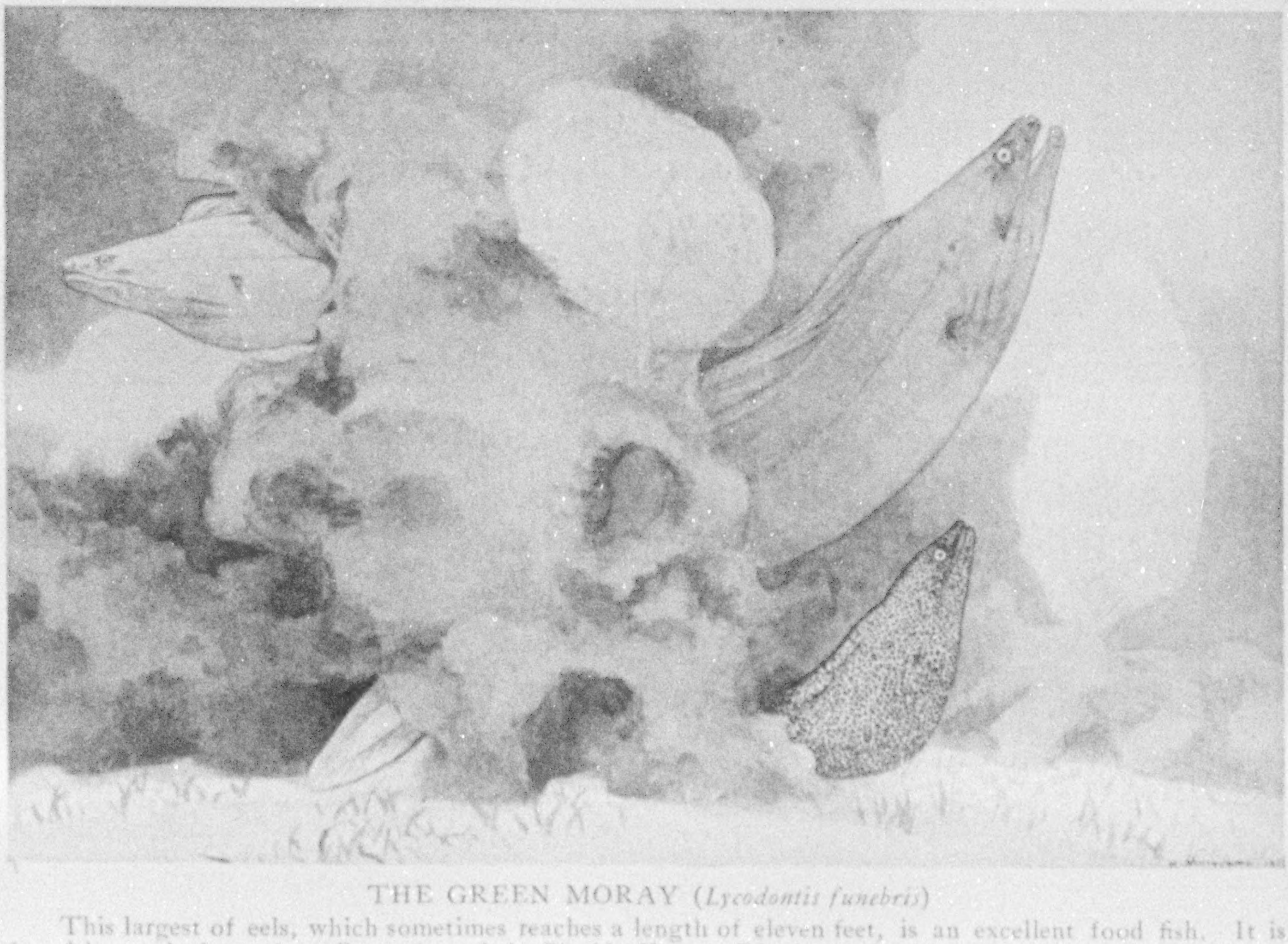
THE SPADE FISH IS ALSO KNOWN AS THE WHITE ANGEL (*Chaetodipterus faber*)

This excellent food fish, which attains a length of from two to three feet, is caught by hook from Cape Cod to Rio de Janeiro. It is especially abundant on our South Atlantic Coast.



THE FOUR-EYED FISH (*Chaetodon capistratus*) AND BUTTERFLY FISH (*Chaetodon ocellatus*)

The Four-Eyed Fish, shown in the left top corner, is a parasite hunter. It even goes into the mouths of larger fishes which remain perfectly still while the little fellow hunts for its prey. The Butterfly Fish is one of the most conspicuous of reef dwellers. Both species are found in Florida and West Indian waters.



THE GREEN MORAY (*Lycodontis funebris*)

This largest of eels, which sometimes reaches a length of eleven feet, is an excellent food fish. It is found in tropical seas from Bermuda and the Florida Keys to Rio de Janeiro, and from the Gulf of California to Panama and the East Indies.

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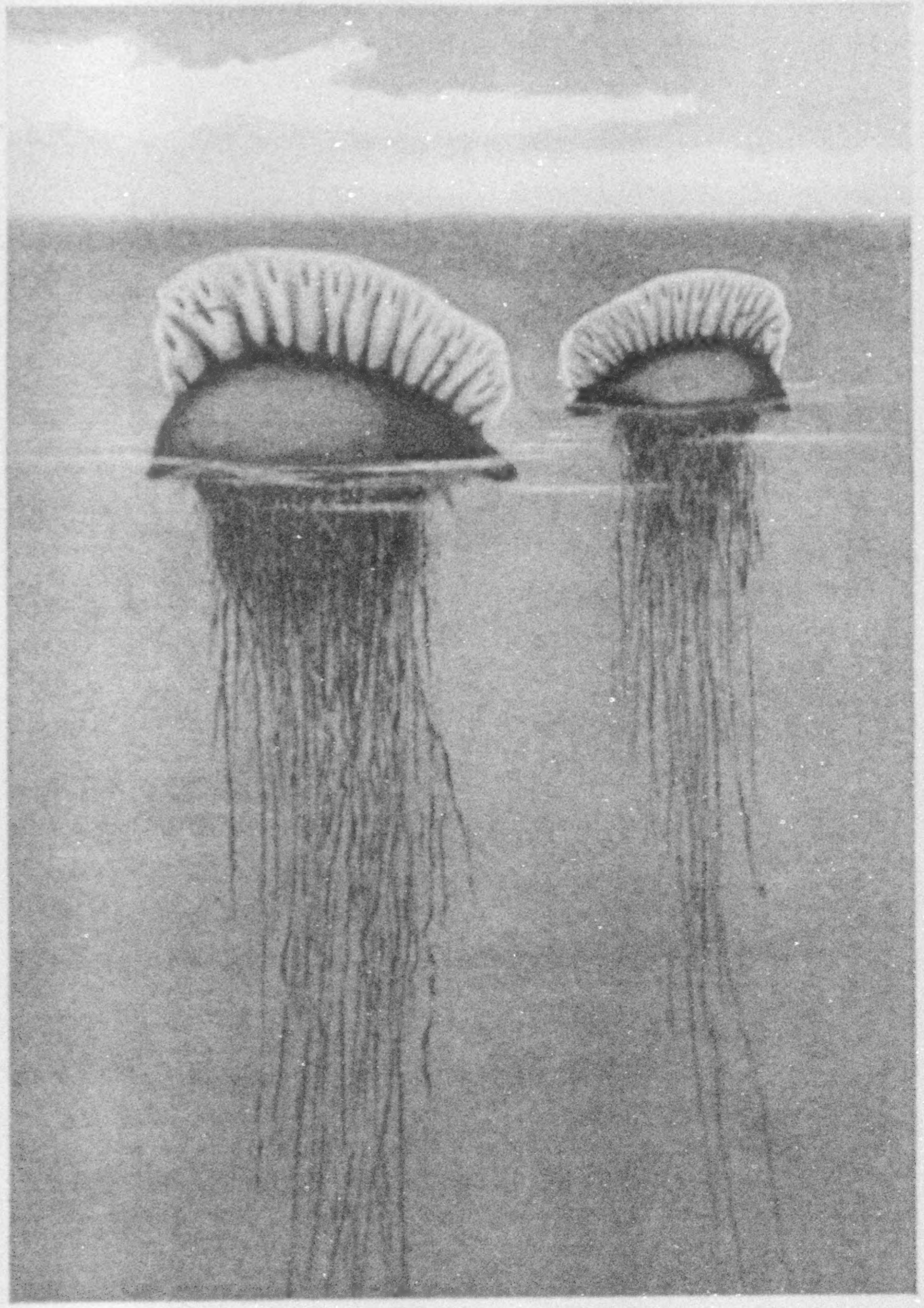
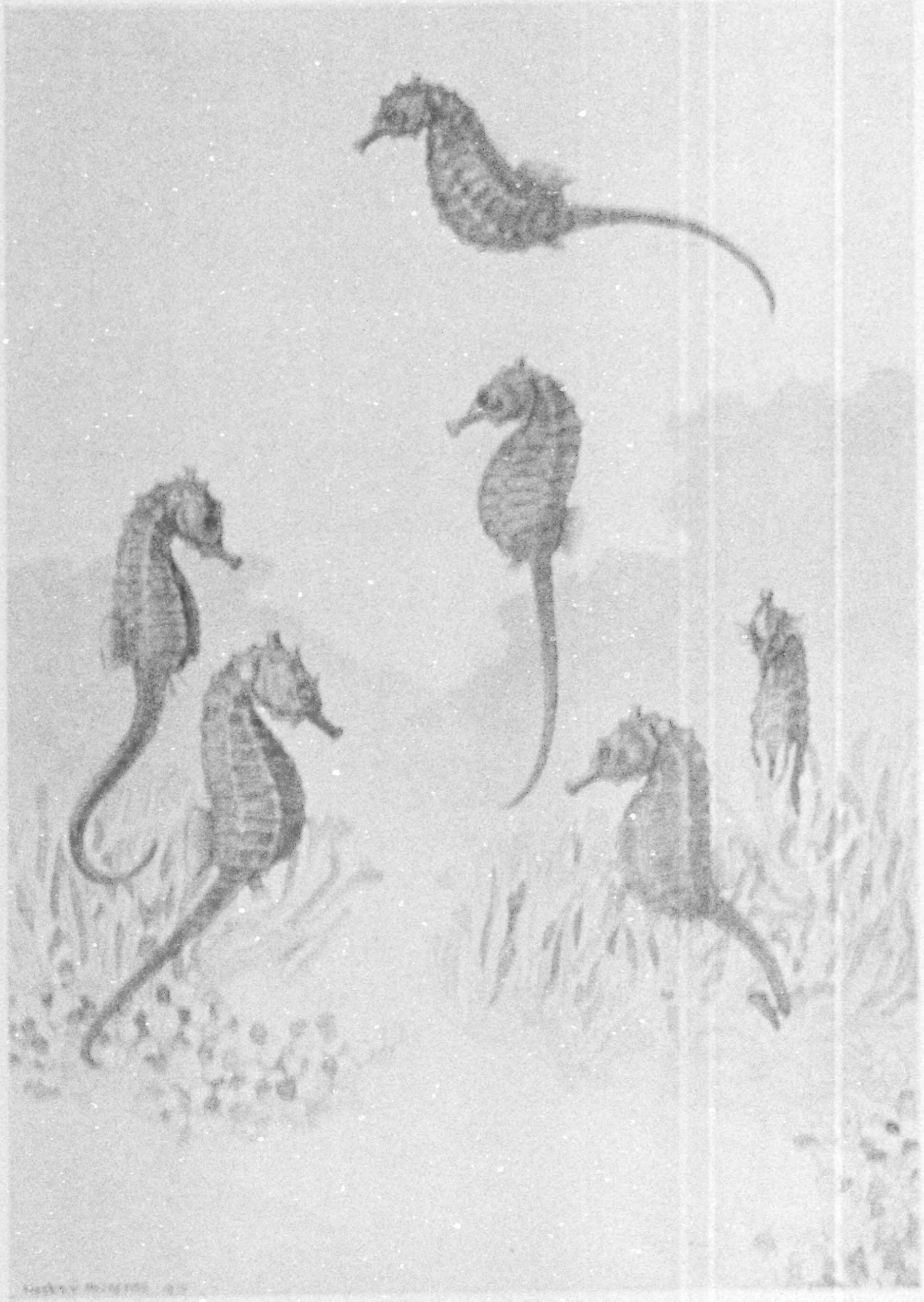


THE PORTUGUESE MAN-OF-WAR (*Physalia arethusa*)

Floating on the surface with the tide and currents, in search of food, this curious sea creature trails its tentacles behind it for forty feet. The tiny fishes upon which it preys become helpless after coming in contact with the stinging cells of the tentacles. The Portuguese Man-of-war is found in tropical seas, but sometimes strays as far north as Cape Cod. Among the tentacles of this creature the little Portuguese Man-of-war Fish hides from its enemies.



THE SEA HORSE (*Hippocampus*)

This is the only fish which possesses a prehensile tail. With its curious appendage, it holds to seaweed while feeding on small crustaceans. The female deposits her eggs in an external abdominal pouch of the male, where they are hatched. The Sea Horse is found in all warm seas, including the Caribbean, the Black Sea, and the waters south of Japan. One species is found from South Carolina to Cape Cod.

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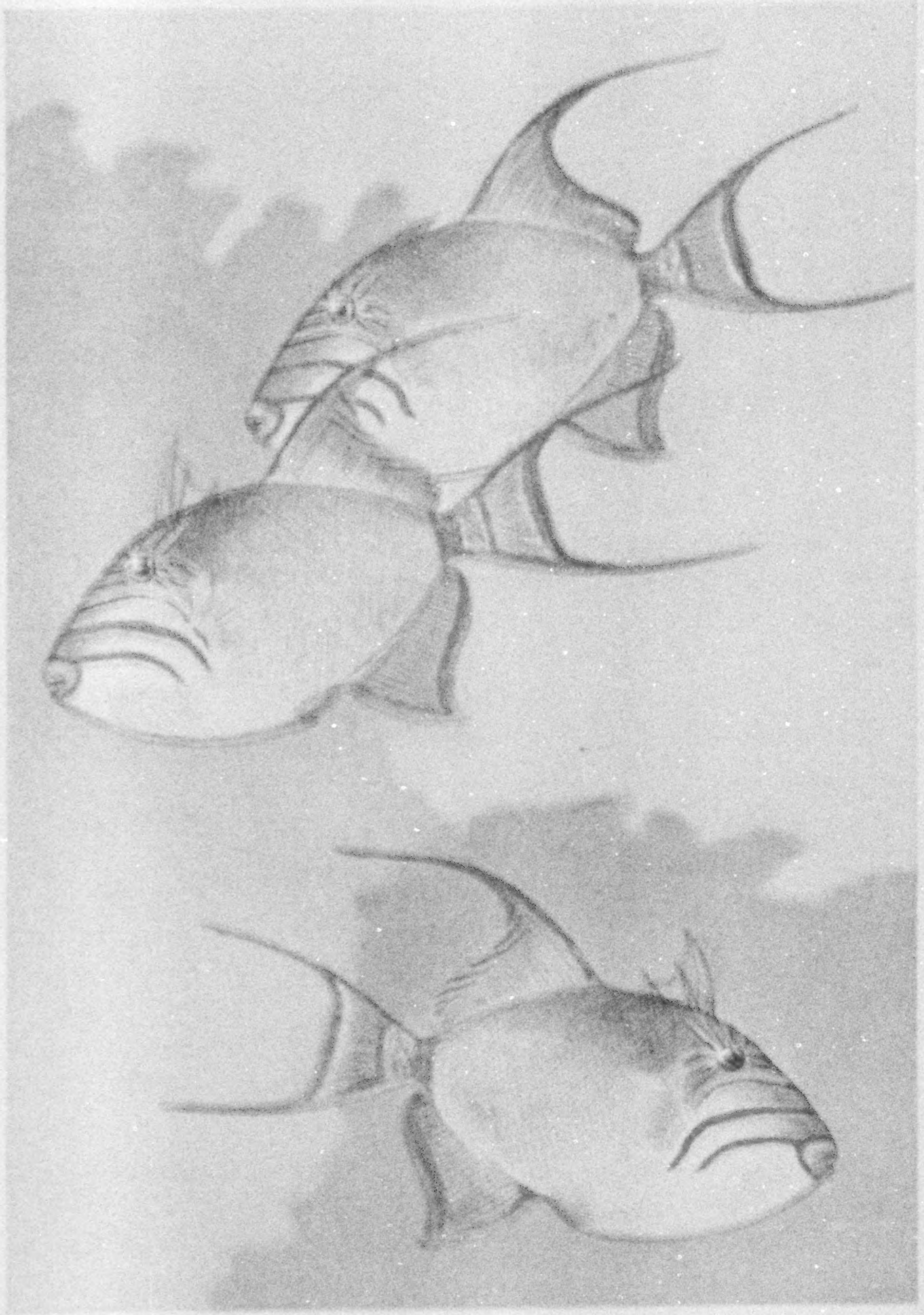
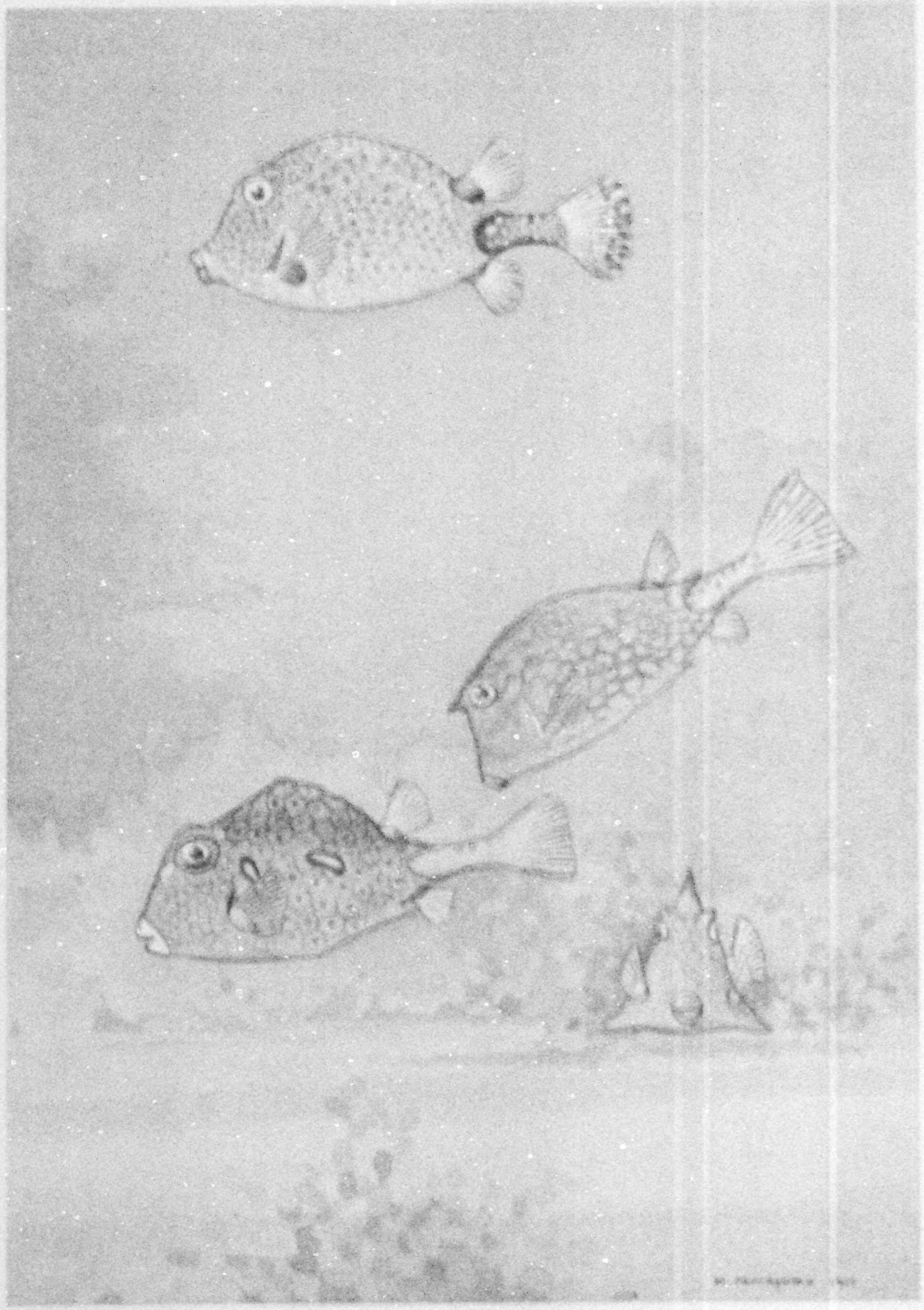


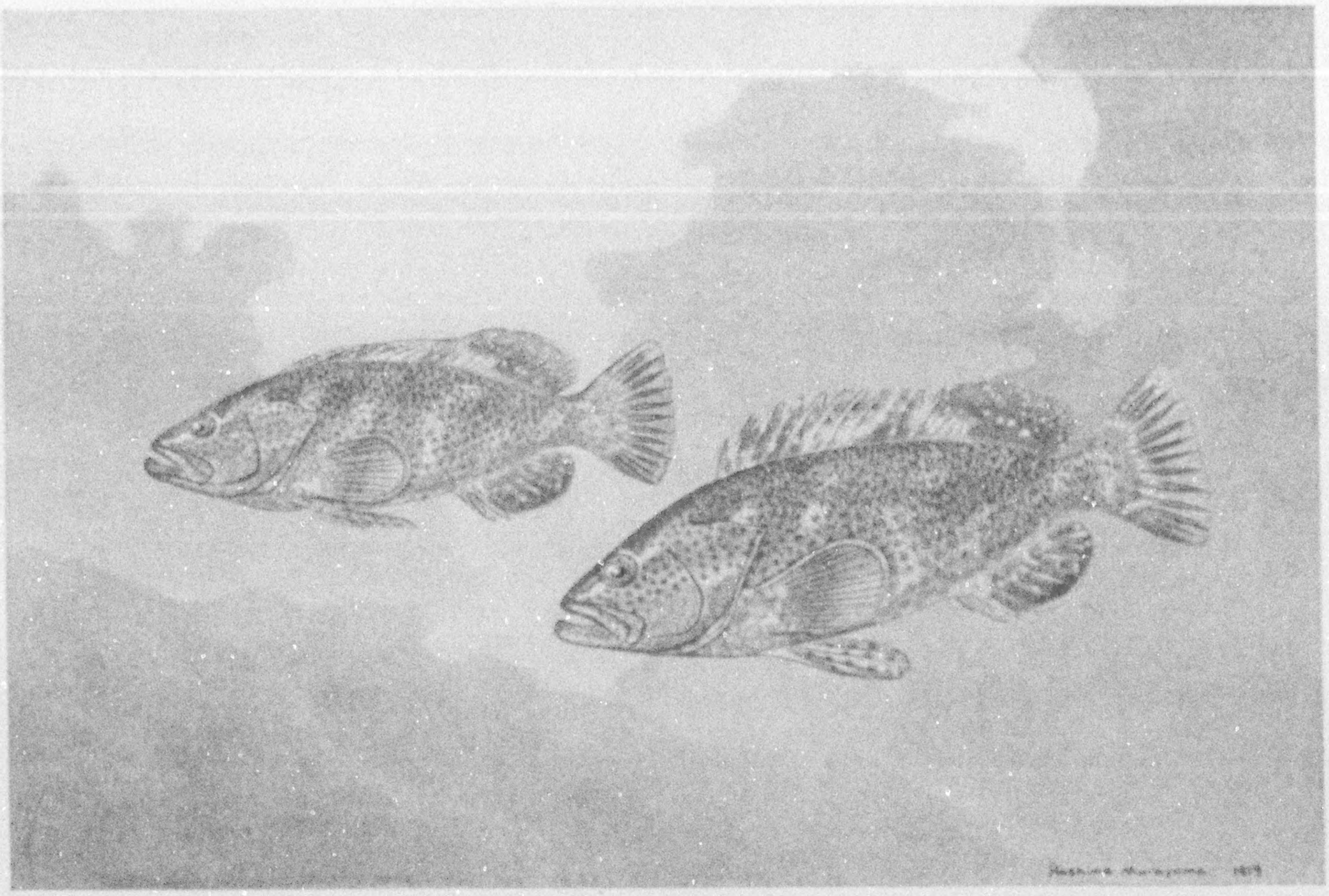
THE QUEEN TRIGGER-FISH (*Balistes vetula*)

Found in Florida, Bermuda, West Indian and Bahama waters, and in the Indian Ocean, the Queen Trigger-fish lives on rocky and grassy bottoms. It has a variety of nicknames, such as "Oldwife," "Oldwench" and "Cochina." It takes the hook readily and is esteemed as seafood. This fish gets its name from the fact that the first dorsal fin is composed of a short, stout, rough spine, with a smaller one behind it and usually a third so placed that by touching it the first spine may be set or released.



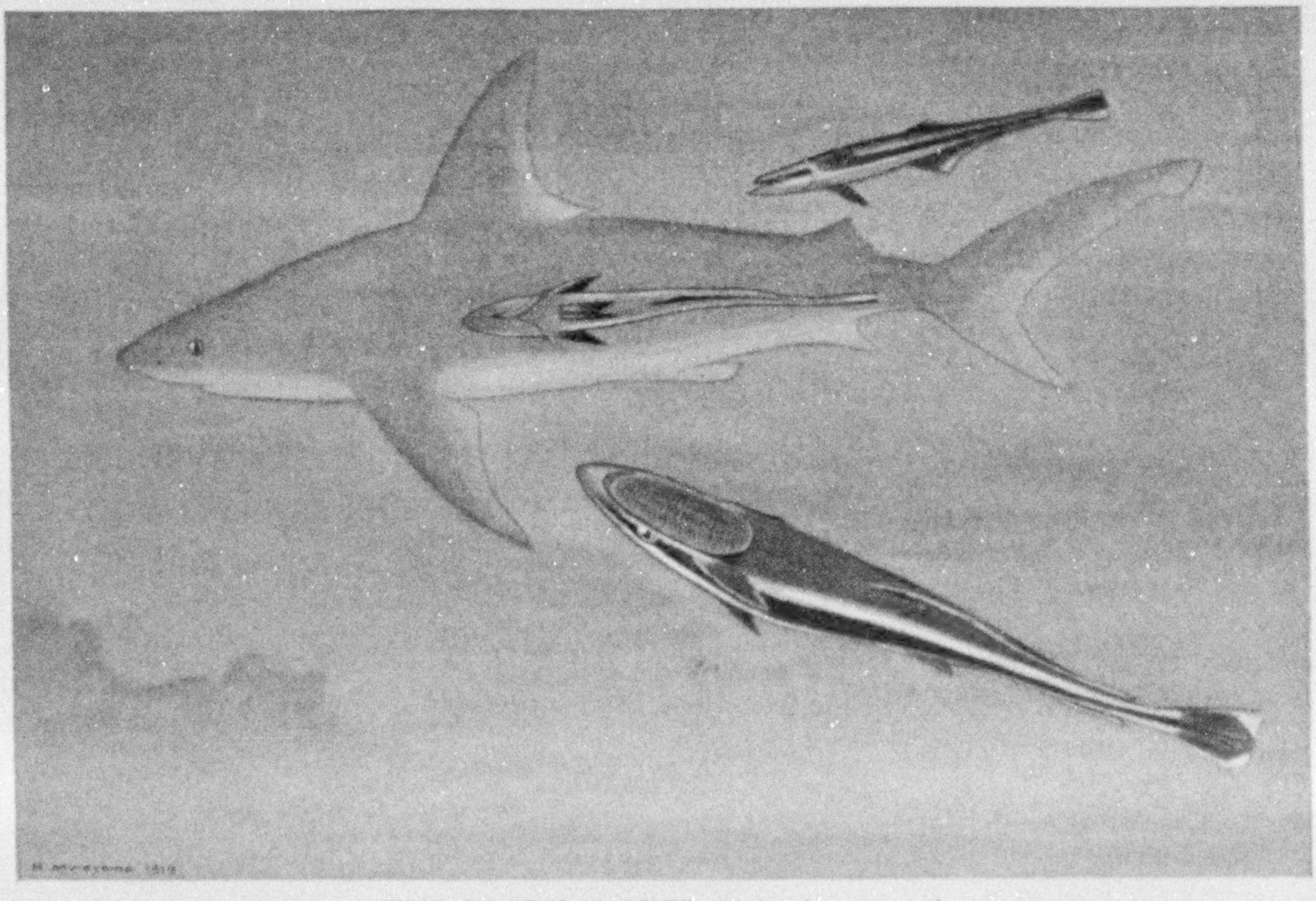
THREE FREAKS OF FISHDOM

Cuckold (*Lactophrys triqueter*), top figure, is a splendid food fish, living in West Indian waters. The Buffalo Trunkfish (*Lactophrys trigonus*), lower left, is a food fish, reaching a foot in length. The Cowfish (*Lactrophrys tricornis*), center, reaches a length of two feet. A face view of the Buffalo Trunkfish is shown in the lower right corner. Each of these fishes has its body enclosed in a hard shell, the fins, eyes and mouth alone being movable. They are often baked in the shell for food.



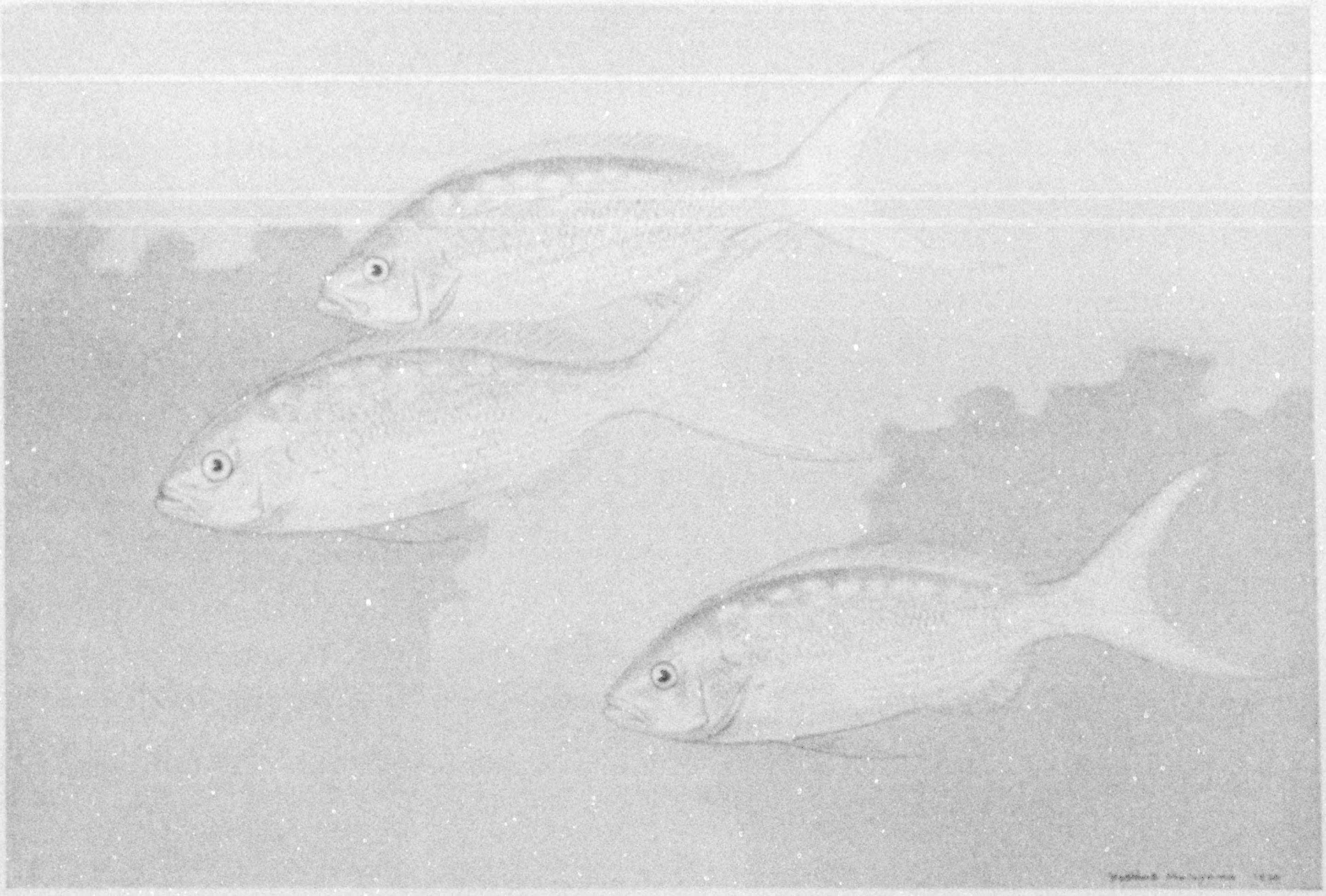
THE ROCK HIND (*Epinephelus adscensionis*)

This spotted beauty inhabits tropical American waters from Bermuda to Brazil, and is often encountered on the east coast of Florida. It lives in rocky places, and is highly esteemed as a food fish, reaching two feet in length.



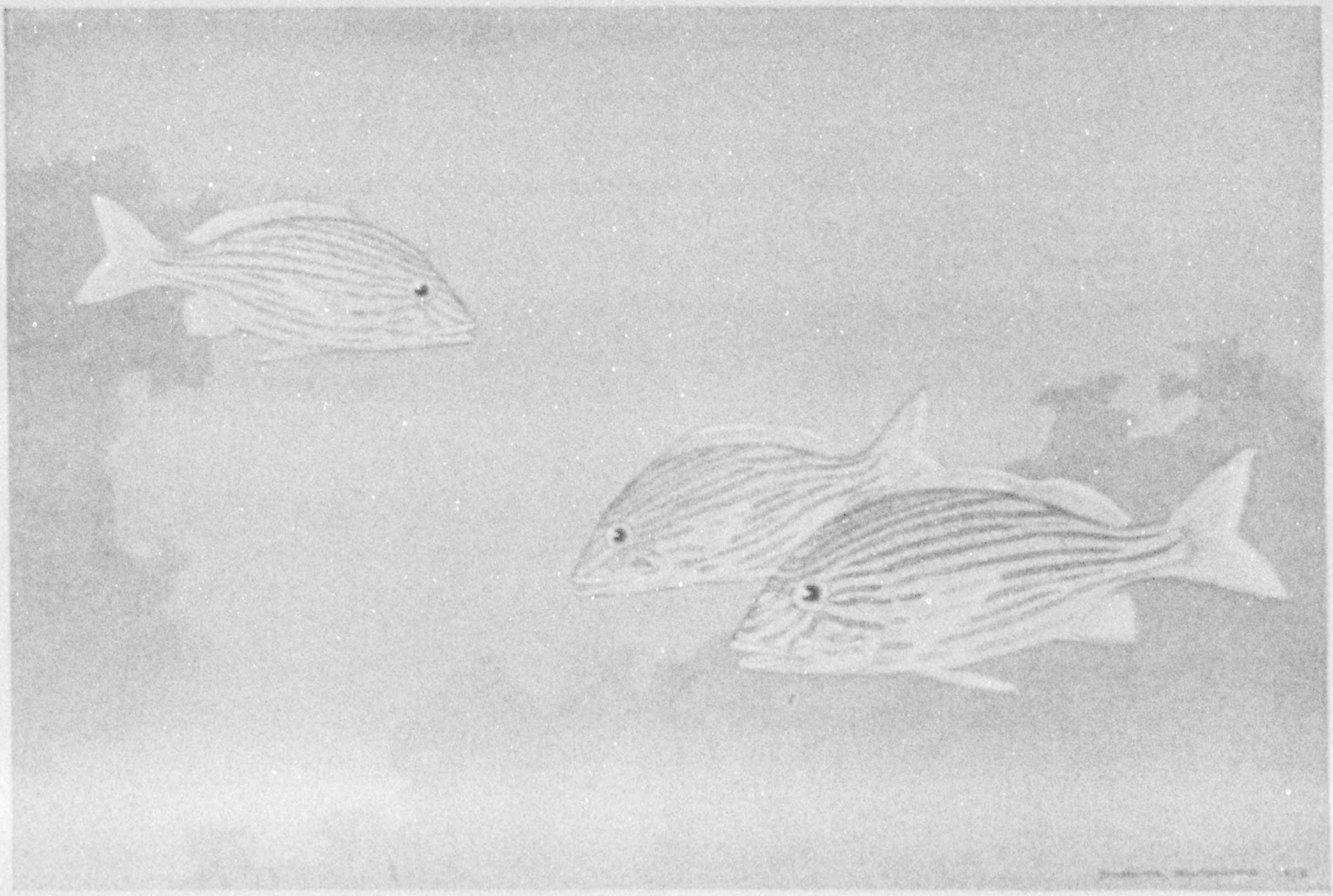
THE SHARK SUCKER (*Echeneis naucrates*)

This curious inhabitant of warm seas attaches itself by means of a suction disk to sharks, turtles, and other large denizens of the deep. On the African coast it is used by natives to capture turtles. The fisherman attaches a cord to the shark sucker's tail, and allows it to swim among the turtles. When it has attached itself to one, the turtle is quickly hauled in.



THE YELLOW TAIL (*Ocyurus chrysurus*)

This excellent food fish, reaching a length of three feet, is one of the gamiest of the snapper tribe. It is found in the waters off the coast of Bermuda, Florida, and the West Indies, as far south as Brazil.



THE BLUE STRIPED GRUNT (*Heamulon sciurus*)

This food fish reaches a foot in length and lives about rocky shores from the Bermudas as far south as Brazil. It feeds on worms and crustaceans.

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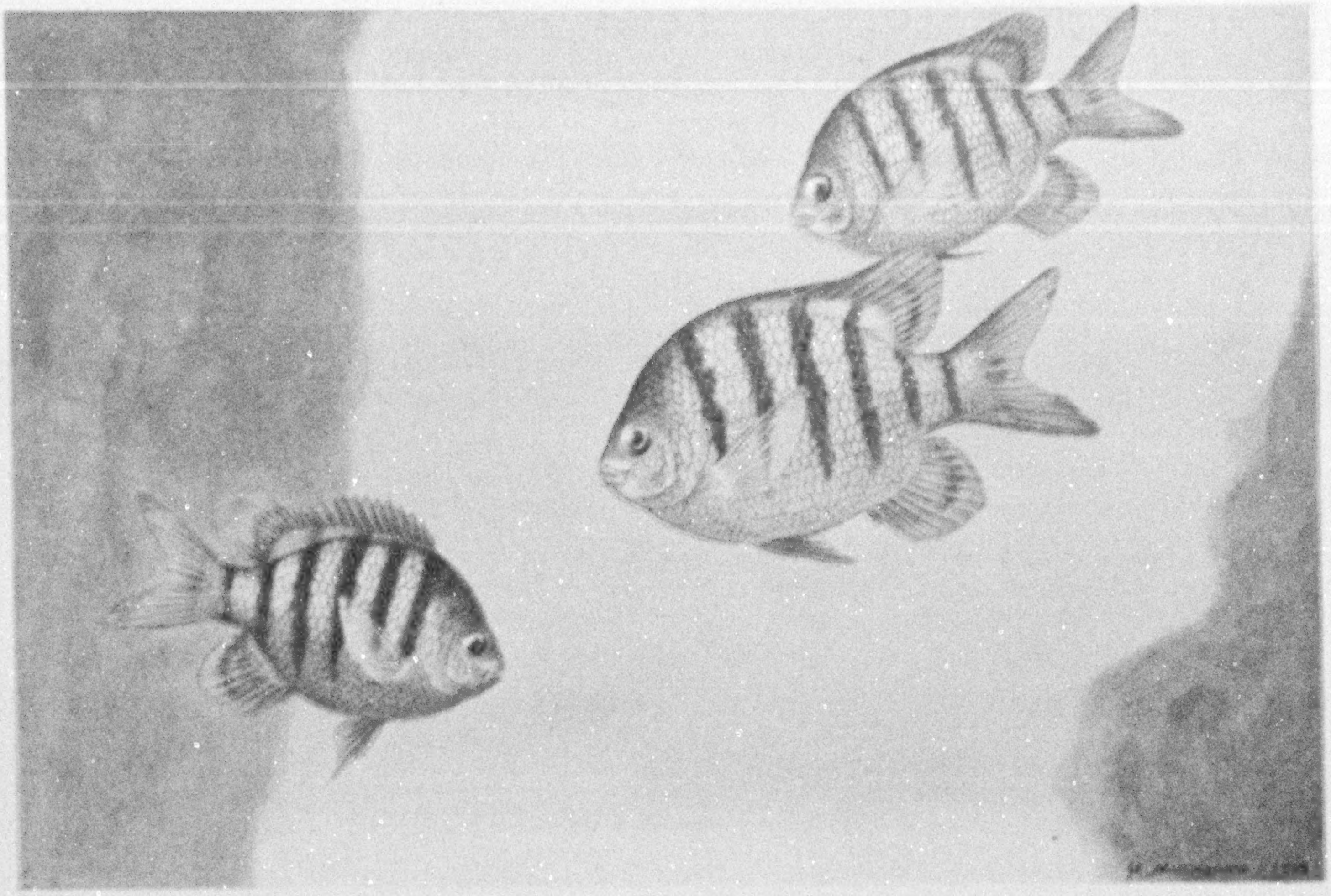
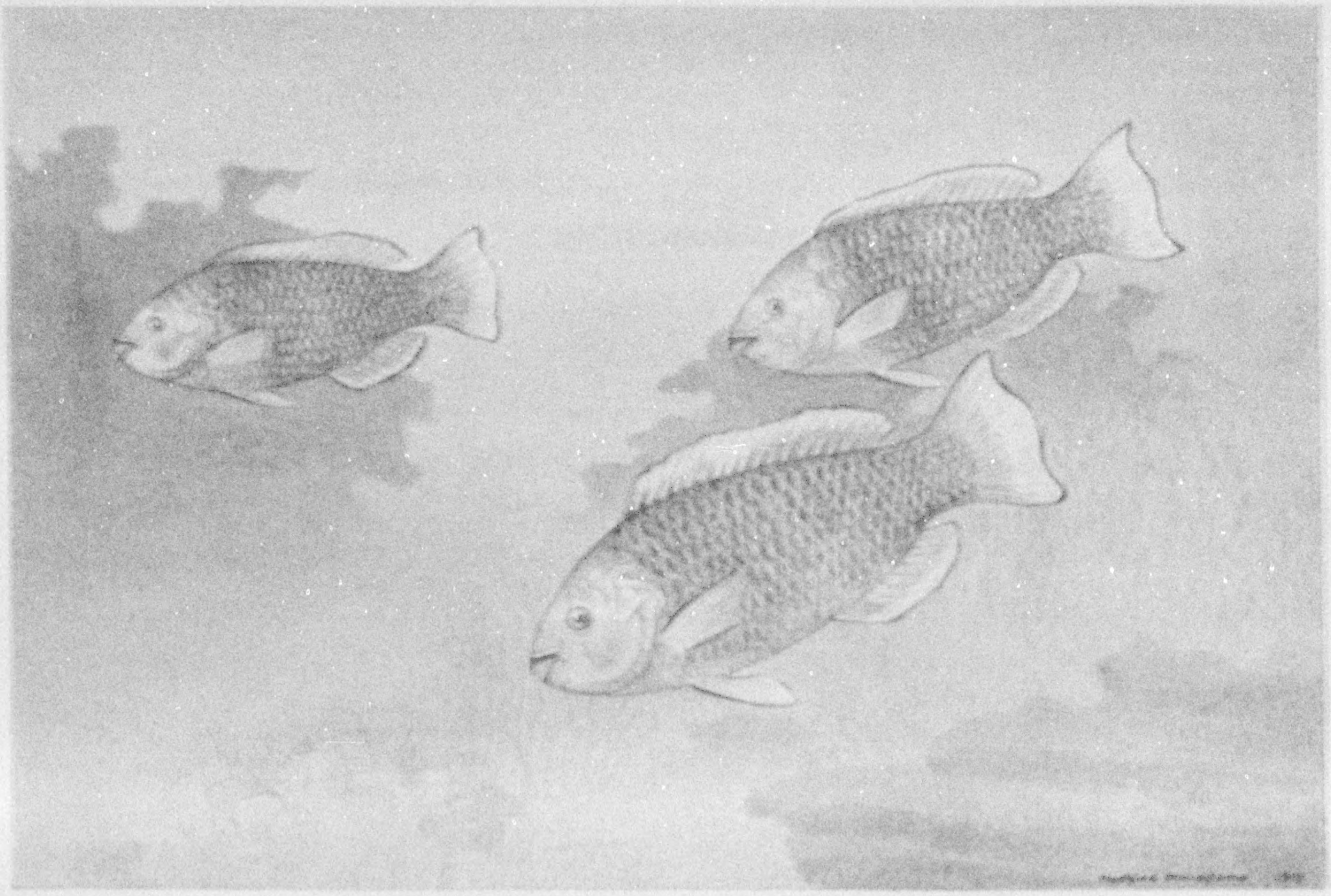


THE SERGEANT MAJOR OR COW PILOT (*Abudefduf saxatilis*)

As its name, saxatilis, implies, this inhabitant of tropical American waters lives among the rocks. It attains a length of six inches and is not used for food.



THE RAINBOW PARROT-FISH (*Pseudoscarus guacamaia*)

Weighing as much as sixty pounds, the Rainbow Parrot-fish is the largest of its family. The flesh is soft but of very good flavor. It is found from the Florida Keys to Rio de Janeiro, and lives on mollusks, worms, and several species of algae.

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INTERESTING CITIZENS OF THE GULF STREAM

By Dr. John T. Nichols, Curator of Recent Fishes

WE THINK of tropical seas as the home of a gaudily colored assemblage of fishes. In a sense, this first impression is correct. Active, short-bodied, elastic-scaled, spiny-finned, bright-colored species here occupy the center of the stage.

As a matter of fact, tropical shore-lines are the great metropolis of the world's fish life. The evil-visaged snake-like Moray (Plate III), one of the most degenerate of true fishes, threads the hidden passages among the coral over which Blue Angel (Plate II) and red, green, or parti-colored Parrot-fish (Plate VIII) are swimming.

Out on the open sand, spotted flounders lie, matching their background so as to be well nigh invisible, or little gray gobies move about like shadows, eager to escape detection.

Countless varieties of fishes are hiding in every patch of weed. Schools of silversides, anchovies, and herring dart through the stretches of open water.

It is their function, in the scheme of things, to feed on the minute organisms so abundant in sea water, to multiply prodigiously, and in turn form a basic food supply for a great variety of larger fishes.

To do this and at the same time contribute something to the forces of evolution, their numbers must be conserved, however. Their silvery sides render them difficult of observation by hungry eyes below, and they are available only to the quick and the keen.

ENORMOUS QUANTITY AND DIVERSITY OF LIFE IN THE GULF STREAM

Over the heat equator warm air is constantly rising. Heavier cooler air from higher latitudes flows steadily in to take its place, and, deflected by the earth's rotation, becomes the easterly trade winds, before which millions of waves, reflecting the clear deep blue of the ocean depths under their white crests, go dancing to the westward.

The whole surface of the tropical Atlantic moves, drifting toward the coast of America, is caught and turned about in the Gulf of Mexico, and shoots out past the Keys and the east coast of Florida as the Gulf Stream.

Inasmuch as many young marine fishes and other animals regularly drift in ocean currents, it is easy to understand what an enormous quantity and diversity of life the Gulf Stream must carry.

Furthermore, such waters, when they enter the Gulf, have already flowed under a tropical sun for many, many miles. The Gulf of Mexico is not a place for them to lose calories, and Gulf Stream water has a considerably higher temperature than the 79 degrees found, in general, at the surface of the open ocean on the Equator.

TRULY TROPICAL FISHES IN FLORIDA WATERS

It follows that shores bathed by such water have as truly tropical fishes as if they were situated much farther south.

Essentially the same fishes extend from Florida to Brazil. Scattered representatives of this great tropical fish fauna of the western Atlantic are drifted to the capes of the Carolinas and, to a less extent, in summer, even to New England. We have seen a stray Spade Fish (*Chætodipterus faber*) (Plate II) on the New Jersey coast and a little Butterfly Fish (*Chætodon ocellatus*) (Plate III) washed ashore on the south side of Long Island, New York.

It is a little over ten years ago that the writer made a first trip to Florida. After a prolonged period of more or less distasteful, though necessary, indoor activities during a northern winter, he found himself suddenly foot-loose on the Miami water-front.

The yachting party that he was to join here on a collecting trip among the Keys was somewhere up the coast, stuck on a sand-bank. Meanwhile, there was nothing to do but sit and swing one's heels.

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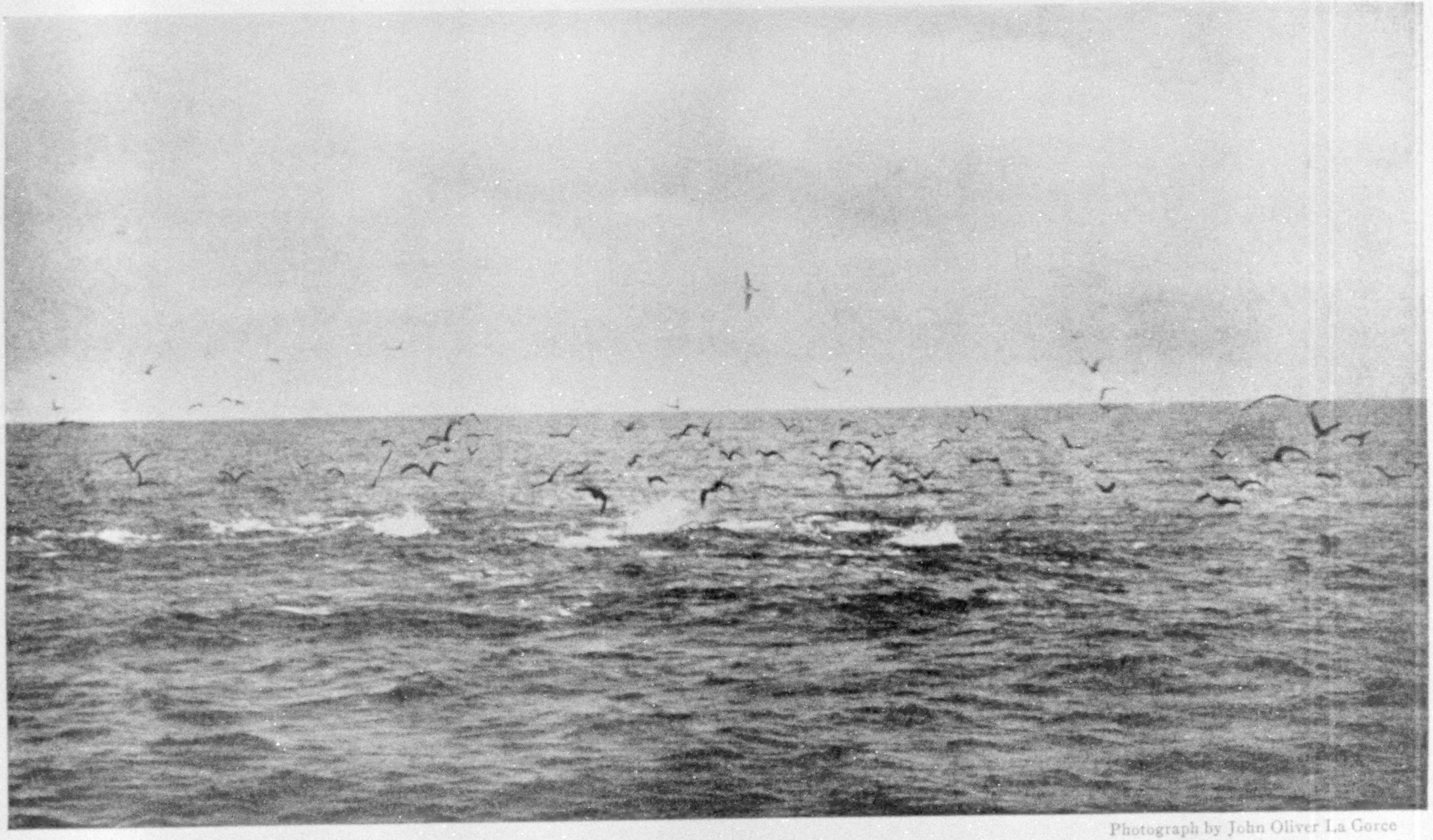

Photograph by John Oliver La Gorce

THE ETERNAL STRUGGLE BENEATH THE SEA

A school of giant tuna fish feeding on myriads of sardines. The tuna were evidently blood-mad and the white patches of water were occasioned by their great bodies breaking above the surface as they hurled themselves among their prey. This is a graphic illustration of the never-ending struggle beneath the wave where the big ones eat the small ones, and only the fittest survive. It is also an evidence of Nature's safeguard against overproduction of species. The swiftly striking tuna charging with wide-open mouth causes the little sardine to jump for his silvery life, but, alas, the instant he shows as much as a fin above the surface low-swinging gulls, attracted from miles around by the disturbed waters, seize him from above. This picture was taken in mid-Gulf Stream and the area covered by the huge school of sardines was several acres.

The first objects of interest were the brown pelicans flapping by. Why they did not break their necks on the bottom when they dove precipitously from a height into water not more than two or three inches deep, was something of a problem.

FISH THAT WEAR VIVID REDS, GREENS, YELLOWS, AND BLUES

But the pelicans were not alone in their ability to see fish. It was soon discovered that a number of interesting species could be observed swimming along the shore. None were more beautiful or as easily identified as the little schools of Pork Fish (Plate I), with their bright yellow markings set off by the bold black pattern on head and shoulders. This fish scarcely belongs with the true, gaudy reef fishes, but rather with those less dependent on the protection of the reef, the golds and blues and rose colors of whose livery are often extremely beautiful, yet seldom striking enough to make the fish conspicuous in the water.

By no means all fishes whose haunts are on and among tropical reefs are brightly colored, but there are a great number of active species found there which wear vivid red, green, yellow, blue, orange, etc., and which, furthermore, are marked in the boldest patterns, frequently with black.

Good examples are the Rock Beauty and the Blue Angel-fish (Plate II). Various parrot-fishes, butterfly-fishes, etc., belong to this class.

Naturalists have offered in explanation that the reef itself was as full of color as a garden of varied flowers, wherein the very brightness of the fishes rendered them inconspicuous. To most observers, however, a coral reef as a whole appears rather monotonous in tone, the many varied fishes swimming about giving it the principal note of high color, and these not only easily seen but readily identified.

SOME FISH CAN AFFORD TO BE CONSPICUOUS

How many northern fishes can one see and recognize as easily, swimming in the water, as the black and yellow Sergeant Major (Plate VIII), for instance? Granted that, in general, these colors render the fish conspicuous, can they be classed as warning colors, like the black-and-yellow striping of wasps? Apparently not, for there are plenty of predaceous fish which eat some of them and would doubtless be pleased to consume more.

Immunity colors, they have been called most appropriately. The idea is that a wide-awake, active fish on a coral reef has so many avenues of escape from its enemies, so many projections to dodge behind and holes to hide in, as to be practically immune from attack. It can afford to be as conspicuous as it likes.

Be this as it may, the striking patterns are a great convenience to the ichthyologist, who has to separate one species from another, for nowhere else does one find so many different, but closely related, species living side by side, each doubtless differing from the others in habits in some way, be it ever so slightly.

THE NUMEROUS FAMILY OF SEA BASSES

One of the principal families of fishes in our southern fauna is the sea basses, to which the gigantic Jewfish, the rockfishes, groupers, hinds, and so forth, belong. These are all fishes which resemble our northern Sea Bass. They are big-mouthed and voracious species, living for the most part about rocky or uneven bottom, though also swimming out over open stretches of sand.

Many are food-fishes of importance. They have leathery mouths, so that when once hooked they are not easily lost. Though well formed and by no means sluggish, they are solitary and sedentary, as contrasted with the equally abundant predaceous family of snappers, for instance.

Always lurking on the lookout for smaller fishes to come within striking distance, and sometimes associated in considerable numbers at favorable localities, they do not range about, hunting in schools, like the snappers.

The colors of this group are varied and sometimes extremely beautiful, in none more so than in the small Rock Hind (Plate VI), whose home is in the bright lights of the coral reef. But the plan of coloring is such as to lower, not raise, the

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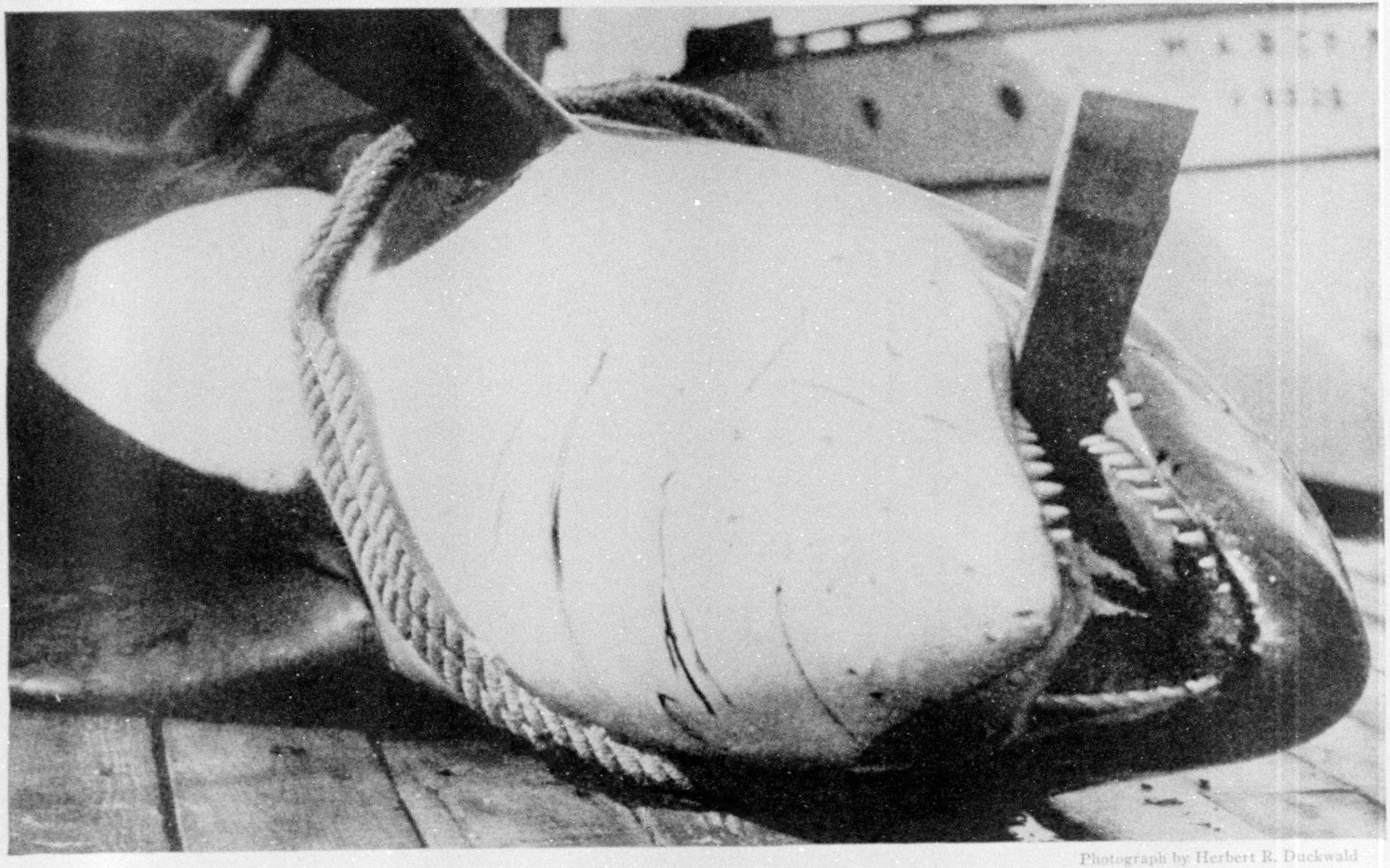

Photograph by Herbert R. Duckwald

KILLER WHALE, THE GREAT WOLF OF THE SEA

The ferocity of the "killers" strikes terror to the other warm-blooded animals of the deep. They are known to swallow small seals and porpoises entire, and they attack large whales by tearing away their lips and tongues. When attacking large prey they work in packs. This specimen was captured in the Gulf Stream between Miami and the Bahama Islands.

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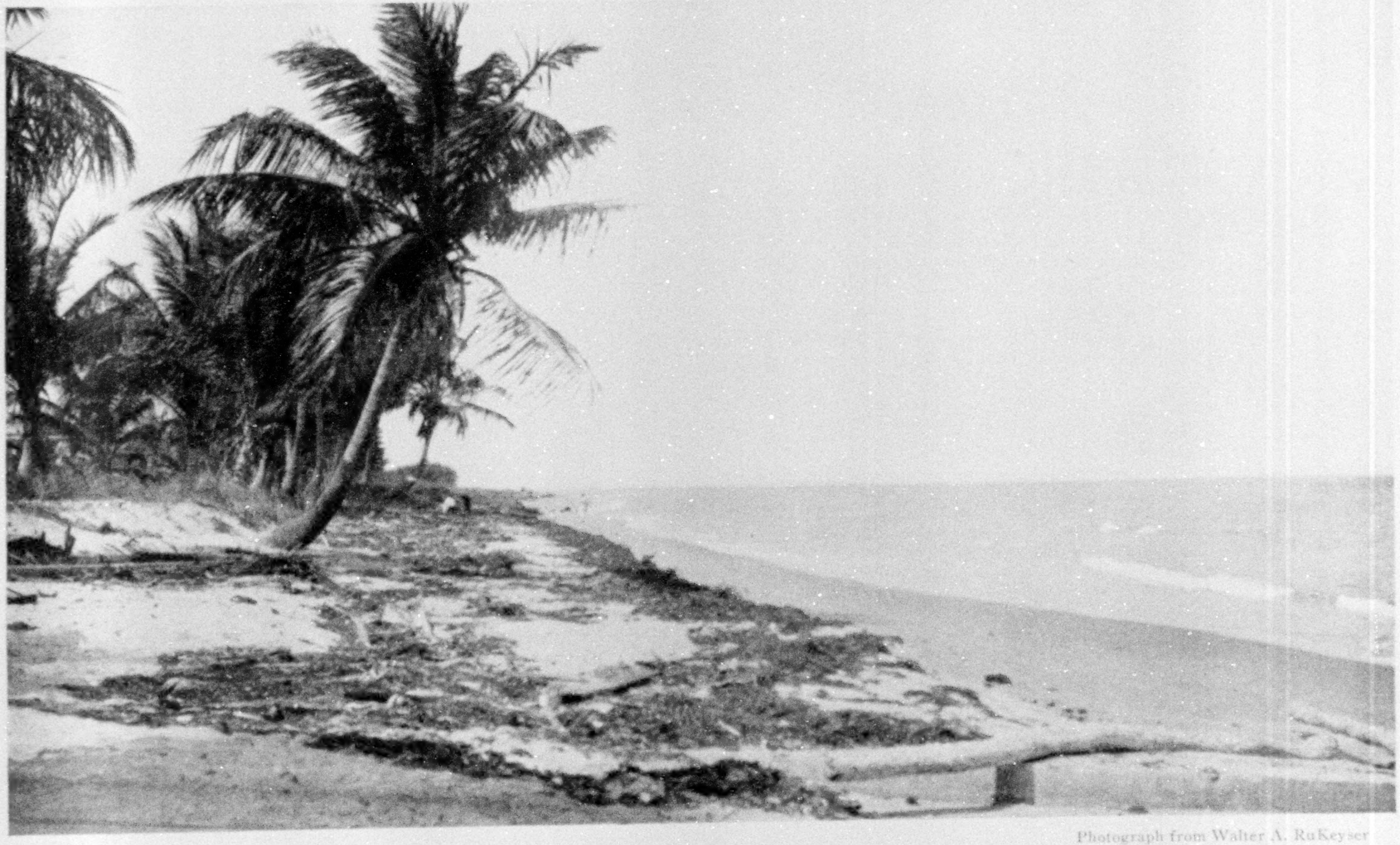

Photograph from Walter A. RuKeyser

MIAMI BEACH AT EBB TIDE

Now and then "on-shore" winds bring strange sea visitors to this beautiful beach from the far-flung reaches of the Gulf Stream. However, a change of wind and tide once again sweeps the sands as clear as a ball-room floor. The near-by aquarium frequently profits by unusual specimens that are brought to shore in the sargasso weed and other forms of sea flora, which afford a hiding place for minute fish of many kinds.

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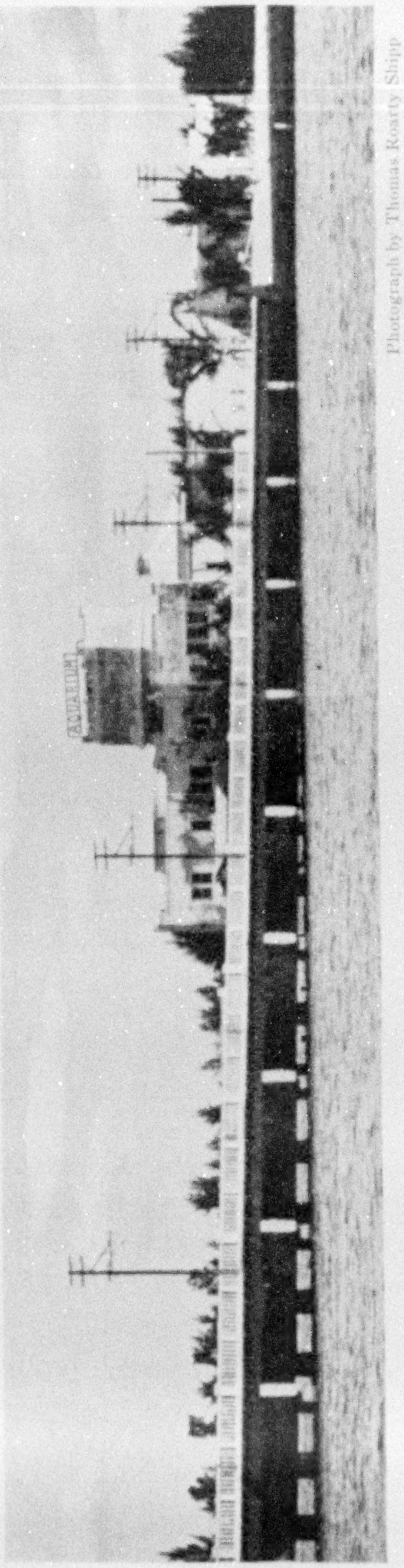

Photograph by Thomas Roarty Shipp

MIAMI AQUARIUM BUILDINGS VIEWED FROM THE SOUTH

The Aquarium is situated at the very terminus of the splendid causeway which spans the iridescent waters of Biscayne Bay, connecting the city of Miami with the ocean beach (see pages 53 to 60).

visibility of the fish. Contrast, for instance, the color plans of the Rock Hind and the bizarre Rock Beauty (Plate II).

CHAMELEONS AMONG THE FISHES

These groupers, rock fishes, and hinds, furthermore, have the power of undergoing complete color changes almost instantaneously. The color tone becomes lighter or darker and the markings become bold or fade and disappear. Such color changes can be seen to advantage in individuals kept in an aquarium. There can be no doubt that in the fishes' natural environment they adapt it to the bottom it is swimming over, and, further, that inconspicuousness may aid in its getting a full meal at the expense of its smaller associates.

There is a related fish which has a color pattern almost exactly like that of the Rock Hind, namely, the Spotted Hind. The principal technical difference between the two is that one has minute scales on its maxillary and the other has not—a characteristic about as obvious to the layman as what the fish is thinking about. The Spotted Hind's squarish tail fin, with a broad, blackish border, affords an amateurish, but simpler, way of telling it.

The fish life of warm shores is one of contrasts. In contrast to the big-mouthed sea basses, there are species, usually sluggish, which have very small mouths, depending for their subsistence on the great abundance of small sea animals found about tropical reefs and ledges, or seaweeds. To capture such small creatures does not require great agility.

THE MALE SEA-HORSE HAS AN INCUBATOR POUCH

The sort of life they lead has probably been taken up gradually, through long periods of time, and many of them have meanwhile acquired remarkable and sometimes quite unfishlike characters of form and structure. None is stranger than the little Sea-horses (Plate IV), with body encased in rings of bony mail, horse-shaped head set at right angles, and prehensile tail to grasp the seaweed where they are hiding, body floating upward erect in the water.

The male sea-horse carries the eggs in a pouch situated under his tail, until they are hatched and the young large enough to fend for themselves.

Sluggish small-mouthed species frequently have hard nipper-like teeth, as the small animals which they eat are many of them shelly.

As it is difficult for them to get out of the way of larger predaceous fish, they are variously protected against attack, mostly being colored more or less in resemblance to their surroundings. The trigger-fishes have a stout dorsal spine which locks erect, as well as a very thick leathery hide which must be of some protection. The gaudy colors of the Queen Trigger-fish (Plate V) are an exception among such forms.

A somewhat related flat-sided filefish scarcely swims about at all, but drifts with the tides, more or less head downward, and can be easily captured in the hand. It is so striped as to be readily overlooked, however, among the eel-grass which is drifting with it.

HOW THE SWELL-FISH FRIGHTENS ITS ENEMIES

The swell-fishes have the power of suddenly inflating the body with water or air until they assume an approximately globular form several times the normal diameter, which must be disconcerting to any enemy about to seize one. The porcupine-fish, in addition to doing this, has the body everywhere covered with long, sharp spines which project in every direction like the quills of a hedgehog. Many persons who are familiar with the inflated skins of swell-fishes and porcupine-fish used by the Japanese as picturesque lanterns will be surprised to learn that both are common in local waters.

The trunk-fishes, instead of being protected in this way, have the body encased in a bony shell, like a turtle. In the East Indies there are rectangular species, but ours are all three-cornered, beechnut-shaped. They go by various names—cuckold, shellfish, and so forth, the Cowfish (Plate V) being a species with two hornlike spines projecting from its forehead. They are excellent eating, cooked in the shell like a lobster.

The back muscles of the swell-fishes are sometimes eaten, but make a risky delicacy, as there are well authenticated instances of severe poisoning from eating these fishes. The poison seems to be localized in the viscera and to permeate the rest of the fish after death.

SOME FISH ARE RISKY DELICACIES

In some quarters of Japan swell-fish is highly esteemed when prepared for the table with care, but there is a Japanese proverb to the effect that before eating swell-fish one should have one's last will and testament in good order.

Poisoning resultant from eating certain species of tropical fishes is a subject which will repay further study. In Cuba several kinds are reputed dangerous and their sale prohibited in the larger markets. Among them are the Great Barracuda (see illustration, page 80), Green Moray (Plate III), and certain species of the Carangiidæ, or crevally family. On the other hand, this same Barracuda is particularly favored as a food-fish in Porto Rico, as it is known to subsist entirely on clean, live food.

It is said in Cuba that by no means all the fishes of these species are poisonous, and that the smaller ones are safer. The symptoms of poison are sometimes alimentary disorders, sometimes skin troubles. The cause is not known, but Mowbray, writing in the New York Zoölogical Society Bulletin, November, 1916, presents a strong case in favor of the hypothesis that such tropical fish poisoning is in most cases due to improper marketing. He says: "It is probable that if, when caught, the fish were eviscerated and bled, a case of poisoning would be a rarity."

Bulletin No. I of the Madras (India) Fisheries Bureau, 1915, thus emphasizes the importance of properly marketing fish in a tropical climate: "Of all general food, fish is most liable to taint and most poisonous when tainted. . . . Fish not kept alive *must be cleaned and washed at sea* and properly stowed. This brings them to shore with a much decreased chance of taint, even if several hours intervene."

SNAPPERS ARE THE MOST IMPORTANT SOUTHERN FOOD-FISH

As food-fishes, the snappers are perhaps the most important southern family.

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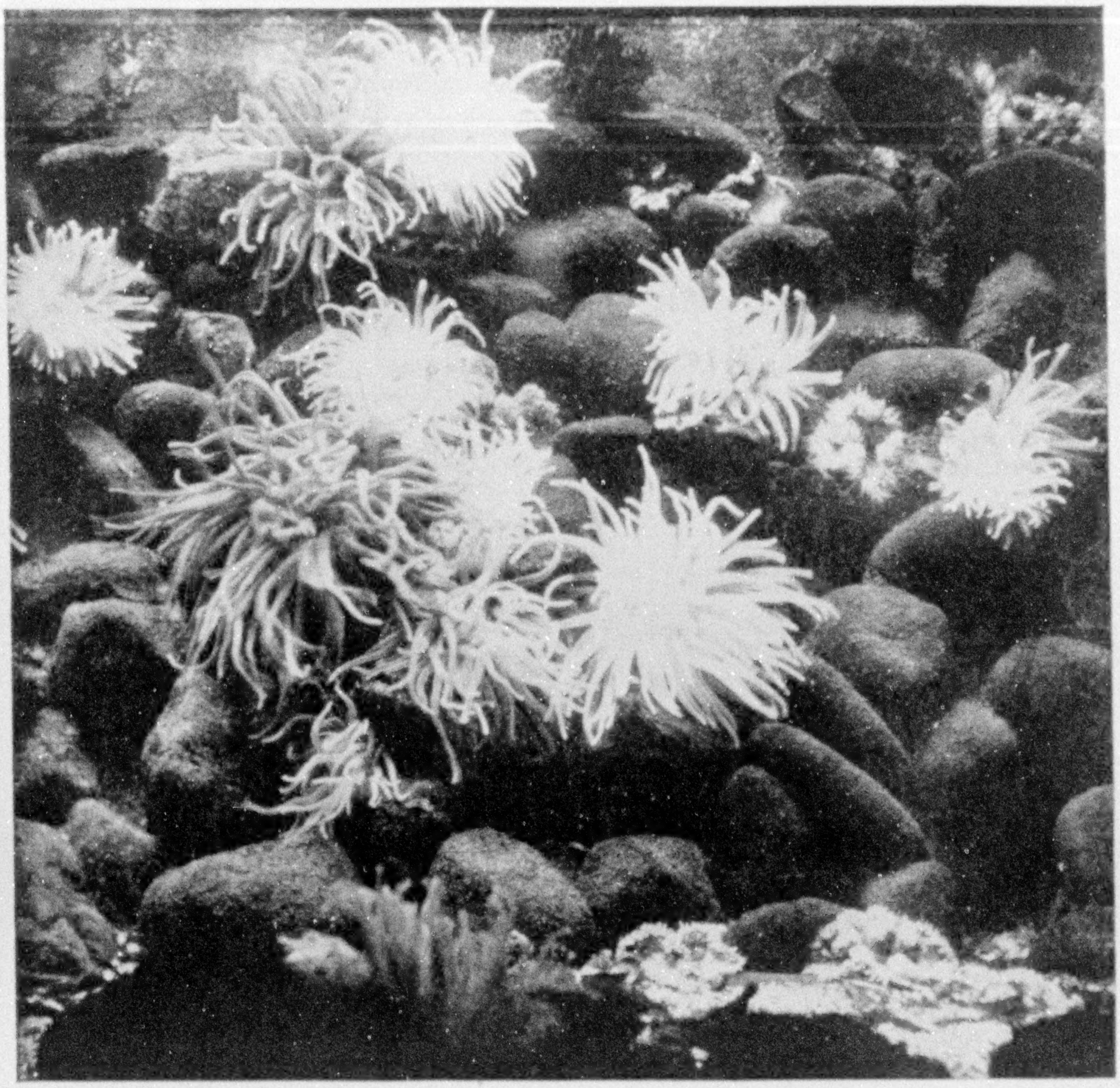


Photograph by L. L. Mowbray

THE WHITE ARMED ANEMONE

Sea-anemones, closely resembling beautiful and many-hued chrysanthemums, are found among the rocks in quiet waters along the Gulf shores. This low form of animal life feeds by arresting with its outspread petal-like tentacles small particles of food floating by, which it then draws toward the central mouth. From a muscular base the anemone can move very slowly from place to place, one observation in the New York Aquarium showing a travel of forty-eight inches in the course of twenty-four hours. They have no food value for man, but are sometimes eaten by fish.

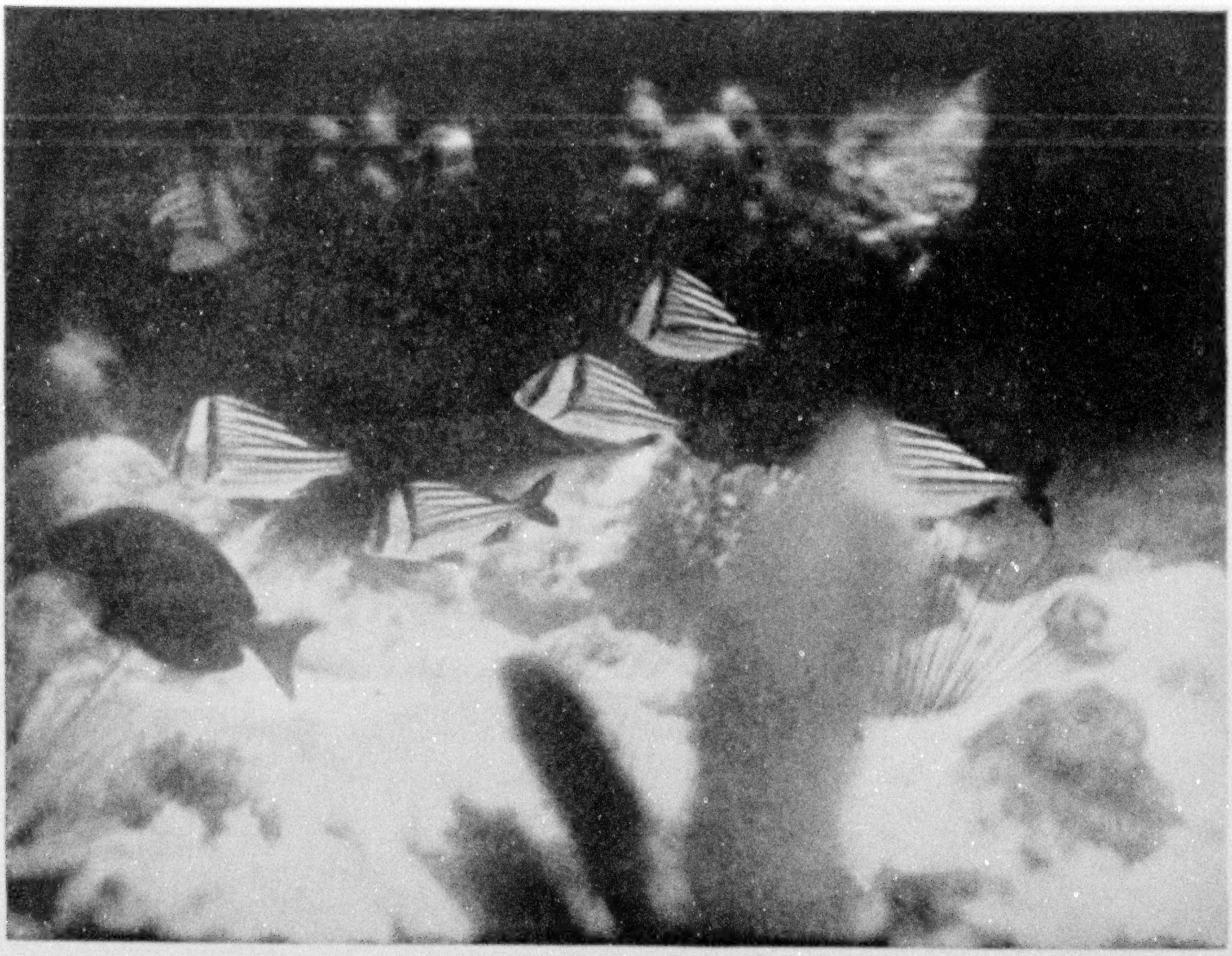
A snapper is an all-around, up-to-date fish, an evolutionary product of the keenest of all competition in the fish world, that at the tropical shore-line.

There is nothing peculiar or freakish about the snapper. He is just thoroughly successful and modern, active, adaptable, and clever—trim-formed, spiny-finned, keen-eyed, smooth-scaled, and strong-toothed.

Almost anywhere one goes one can see little schools of the Gray Snapper through the clear tropical water, skirting the shore or the edge of the mangroves, on the lookout for small fry to satisfy their appetites, and at the same time with a weather eye out for possible danger. It would seem a simple matter to catch one on hook and line, but no fish is warier about being thus ensnared.

Several species of snappers are almost equally abundant, the Muttonfish and the Red Snapper, which is taken in comparatively deep water, being perhaps the most important commercially.

The excellence of the Red Snapper is



Undersea Photograph by Dr. W. H. Longley

PORTRAIT TAKEN BENEATH THE SURFACE OF THE SOUTH ATLANTIC

Porkfishes and tang against a background of live coral six feet or more under water among the Florida Keys. The shadowy object, suggesting an irritated porcupine, near the lower right corner, is a purple sea-urchin with spines erect.

widely known, and quantities of this fish are shipped to distant northern markets. For baking, a fine large one has few equals. Bright red color in fishes has often a peculiar significance, which will be spoken of later.

Though not exactly a snapper, the excellent table-fish known as the Yellow Tail (Plate VII) belongs to the snapper family. It is somewhat more elongated than the true snappers, with lines more graceful, and its tail-fin is more deeply forked. One sees immediately that it is a freer, swifter swimmer, navigating wider stretches of more open water.

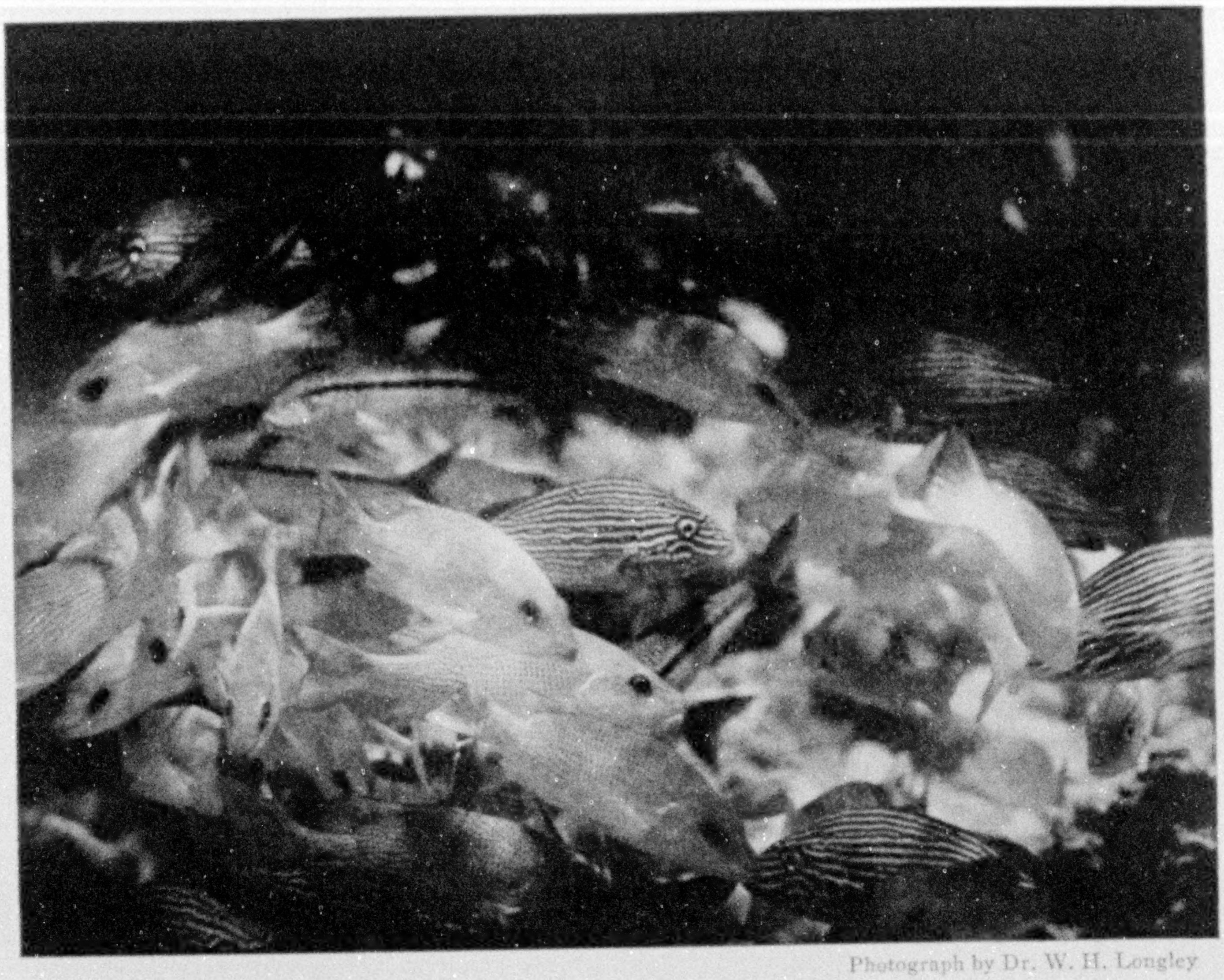
WHY SWIFT SWIMMING FISH HAVE FORKED TAILS

Most marine animals which swim, especially swiftly and continuously, have a forked tail-fin. This shape of tail avoids the space immediately behind the axis of the body where the stream-lines following the sides (of a moving fish) converge. A rounded or pointed tail which would occupy such area would be a drag.

Whales and porpoises, though they move the tail up and down instead of from side to side, have a forked tail-fin, only it lies in a horizontal instead of a vertical plane. The wide ranging members of the mackerel family and other more or less related marine fishes have a forked tail-fin set on a firm, narrow base; and the freest swimming sharks (mackerel sharks and the Man-eater) have acquired a tail of the same shape, though the ordinary shark tail is weak and unsymmetrical.

Fresh-water minnows almost invariably have a forked tail-fin, waters which they have to traverse being considerable in relation to the small size of the fishes themselves.

In the blues and greens of the waters



Photograph by Dr. W. H. Longley

PANIC UNDERSEAS

This wonderful photograph was taken, not in an aquarium tank, but about eight feet under water in the Gulf Stream, with an especially designed camera. Posing for their portraits are gray snappers, yellow goatfish, grunts, a parrot-fish, and a schoolmaster, nocturnal fish, which, as a rule, rest quietly all day. The seeming confusion is due, however, to the presence in their neighborhood of a barracuda, that veritable tiger of the warm seas and the natural enemy of all small fish.

through which it swims, the Yellow Tail's bright yellow tail probably makes a shining mark, though its colors otherwise are well calculated to give it a low visibility. Are we to conclude from this that there are no larger fishes which prey on it? No; there pretty surely are such fishes, though it may well be so swift as to escape many which would otherwise do so.

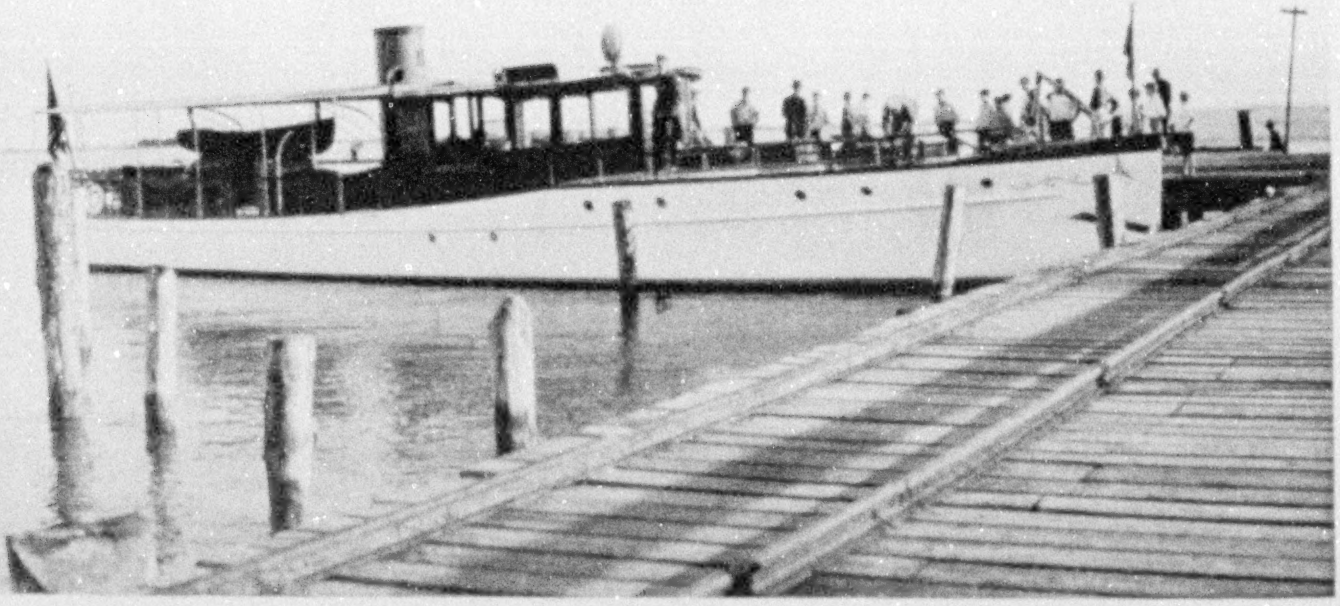
DEEP SWIMMING FISH ARE OFTEN RED IN COLOR

As regards concealment, having a yellow tail must be a disadvantage to it, and is a character which would doubtless have been lost in the keen competition of the tropical waters where it lives, were there not, on the other hand, some compensating advantage. It may be a badge of identification, useful to a school in keeping together.

It has been previously mentioned that the Red Snapper comes from deeper water than other common snappers. There is a tendency for fishes which swim deep down under the blue or green sea and yet within the range of surface light penetration to be red in color. A great many are not, to be sure, but a larger proportion are red here than elsewhere, frequently a clear bright striking red all over.

It seems almost a pity that the light in which they live is so green that the color, red, must appear an intangible neutral gray! Perhaps it gives them a useful inconspicuousness down there, or perhaps it absorbs a maximum amount of the dim, strongly blue-green sunlight, which is in some way beneficial.

One of the commonest species of the surface reefs, the Squirrel Fish (Plate I),



Photograph by James A. Allison

MIAMI AQUARIUM COLLECTING CRUISER "L'APACHE"

L'Apache, Captain C. W. Peterson commanding, is one of a fleet of three power cruisers used for investigating fish habitat in southern Florida waters and among the Bahama Islands. The *Allisoni* and *Chub*, sister ships, were built for the purpose of gathering and bringing in live specimens in their especially constructed live wells (see pages 53 to 60).

has a regular, bright, "deep-water" red color. But the mystery of how it comes to such a color is easily explained, for it has similar relatives living deeper down. Evidently the Squirrel Fish has recently come up in the fish world, and its big eyes indicate that it has not yet adjusted itself to the bright light of the surface sun, but is more or less nocturnal.

The Gulf Stream runs so close to the coast of Florida that, when the wind is right, quantities of the drifting yellow gulf-weed it carries are washed ashore and into the bays. A variety of fishes hide in and about this weed.

One of the commonest and perhaps the most interesting, namely, the Mouse Fish, spends its entire life in the drifting sargassum. Colored in wonderful mimicry of this habitat, its shape also, grotesquely irregular, covered with leaf-like processes or flakes, heightens the resemblance, so as to make it well nigh invisible. This protection against larger fish which might disturb it probably also serves the purpose of camouflage to enable it to approach and capture smaller fish, crabs, and shrimps.

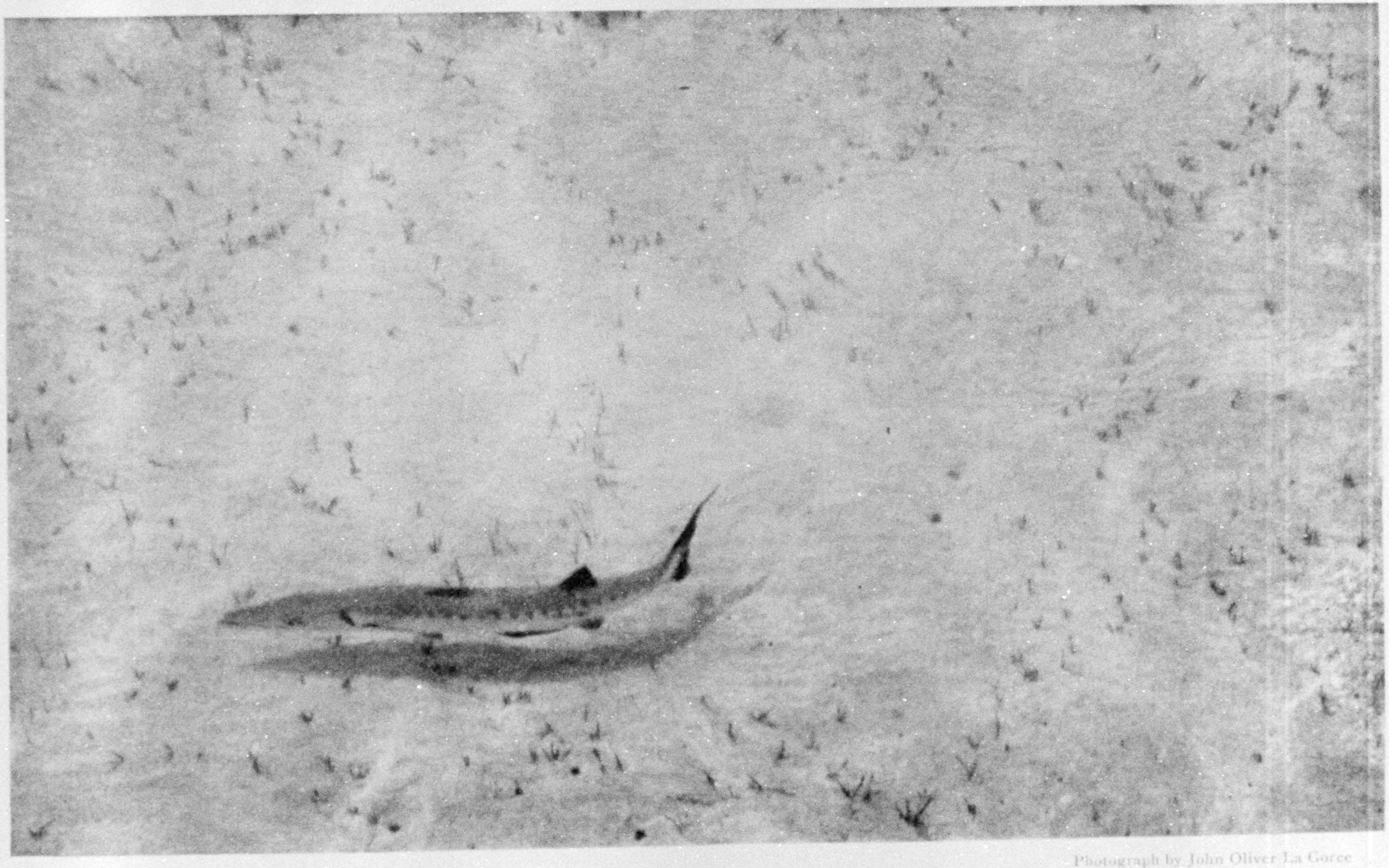
The Mouse Fish, for its size, has a large mouth and appetite in proportion. Many other species hide in the weed when young and, as a rule, have colors to match at that time of life, though later these may be quite different.

THE PORTUGUESE MAN-OF-WAR HAS A FAITHFUL COMPANION FISH

The rainbow-tinted pink, blue, or purple bubble-like floats of the Portuguese Man-of-war (Plate IV) drift at the surface over all tropical oceans and are sometimes washed in close to the shore in numbers. With them comes an interesting little fish, *Nomeus*, the sting of which is exceedingly severe, which never strays far from the tentacles which stream below the Man-of-war.

When traveling by steamer along the Florida coast the writer has watched for *Nomeus*, and from where he stood on deck has seen one and sometimes more individuals lying suspended in the clear water, their blackish ventral fins conspicuously spread, always within a short distance of a Man-of-war, floating above.

Comparatively few kinds of fishes are abundant "off-sounding," away from the influence of the shore-line, and these may



Photograph by John Oliver La Gorce

THE SEA TIGER—A BARRACUDA

Because of the clarity of the waters of the Gulf Stream and with the ever-occurring carpet of white sand on the bottom to be found along Floridian shores, this unusual photograph of a five-foot barracuda was obtained by simply holding a kodak over the side of the boat and snapshotting the big fish swimming along six feet or more below the surface. Because of the splendid illumination afforded by the sun on the white sand, even the shadow of the fish, as well as the little tufts of sea flora, was recorded.

be divided rather sharply into the hunters and the hunted. Mouse Fish and *Nomeus,* belonging to the latter class—the one hides, the other lives under the protection of a powerful companion.

WHEN THE FLYING-FISHES PLAY

Flying-fishes, which are abundant, have an even more interesting method of escaping their enemies, leaping above the surface and, with favorable wind conditions, shooting through the air for perhaps as much as an eighth of a mile, supported by their long, stiff breast-fins, widely spread at right angles to the body. When there is a whole-sail breeze blowing, they seem to fly also for sport.

A flock of little flying-fishes no bigger than herring, all in the air at once, gleaming blue and white silver in the sun, is one of the most beautiful sights of a tropical sea. The very thought of it takes one back to the broad blue expanse of trade-wind ocean, warm decks lurching under foot, spray singing through the shrouds, squawking tropic birds and bellying square-sails which swing against a background of fleecy cloud and sky.

In spite of their agility, flying-fishes form the chief food of the little schools of Oceanic Bonitos, and of the Dolphins, swiftest, most graceful, and most highly colored of marine fishes, which prowl over the high seas.

THE PRIMEVAL SHARK IS STILL WITH US

Ages before modern fishes, of which we now find such countless variety in tropical seas, had been evolved in the slow process of evolution, there were sharks which differed comparatively little from those of the present day. Intermediate forms have become antiquated and dropped out, but the primeval shark (Plate VI) is still with us. Especially in the tropics they occur in great abundance.

Prowling singly along the edges of the reefs, over the shallow flats, or through offshore stretches of open water, they hunt largely by sense of smell, and congregate in numbers wherever food is abundant.

When a whale is being cut up at sea it is astonishing how quickly the slender offshore Blue Sharks gather to the feast; it would almost seem from nowhere.

By far the most abundant sharks numerically are the ground sharks (*Carcharhinus*). There is probably no tropical or temperate coast-line where one or more species of this genus do not enter the bays and inshore water at the proper season to give birth to their young.

SHARKS PROPAGATE UNLIKE MOST OTHER FISHES

Though relics of a bygone age, as far as bodily structure is concerned, sharks, of all fishes, have the most highly developed reproductive system. Some lay a few large eggs, each one protected by a horny shell, but for the most part the egg stage is passed through within the body of the parent fish, and the young are born well grown and able to fend for themselves.

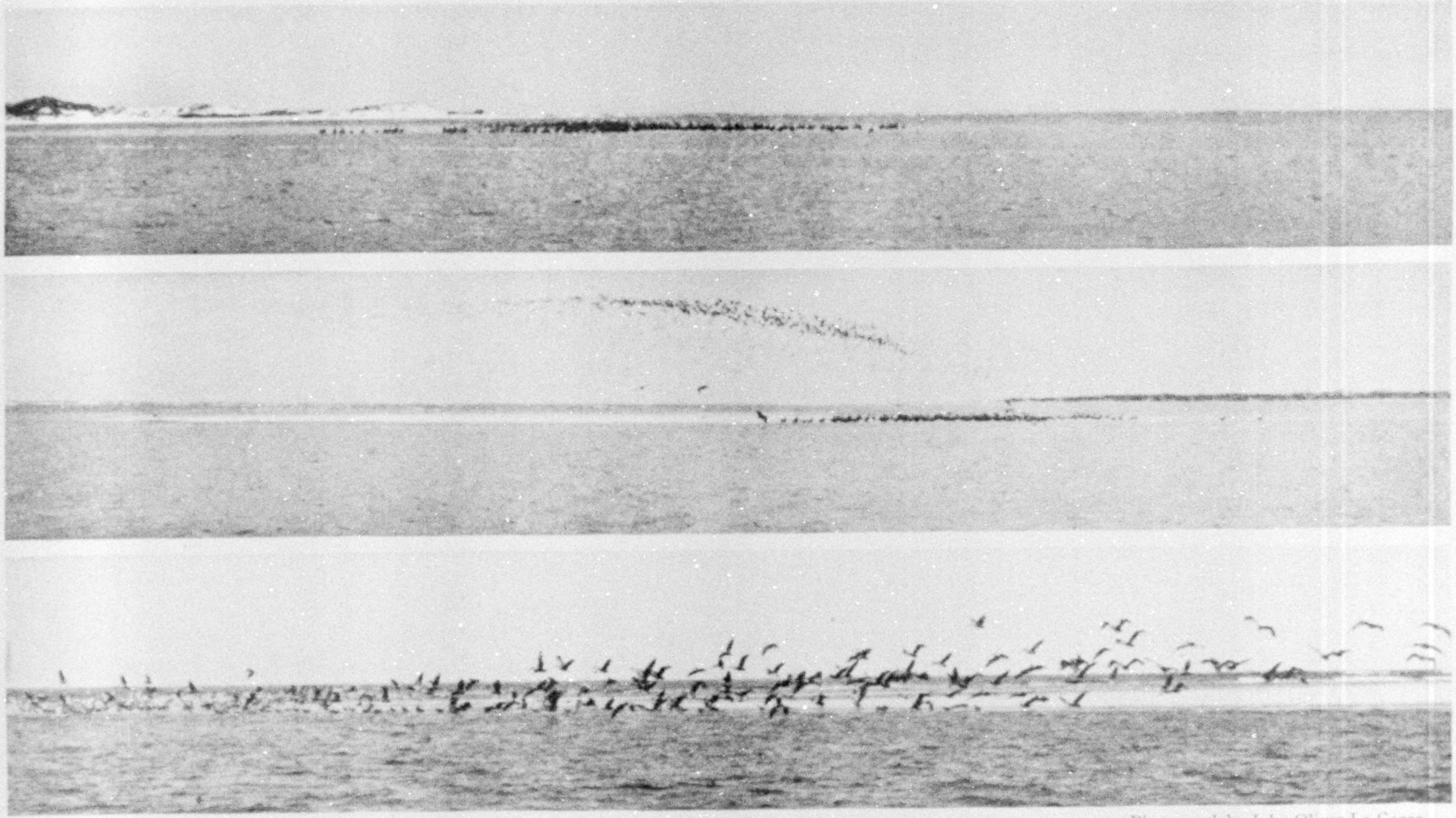
The Black-tip Shark (*Carcharhinus limbatus*) is a small species of ground shark, females of which are taken with young in the Bay of Florida in April. They are frequently hooked by tarpon fishermen, who erroneously call them "mackerel shark," and put up a spirited fight when so hooked. They are usually between five and five and a half feet in length, and the young, about three to six in number, are two feet long, or a little less, when born.

We have data concerning another ground shark, *Carcharhinus milberti,* the Brown Shark, which gives birth to its young in Great South Bay, New York, in midsummer. The mother sharks are a little larger—six or seven feet—the young, however, of about the same size, but more of them, eight to eleven having been recorded for this species. Some kinds of sharks which grow much larger have a proportionately larger number of young.

While evolution has been molding other more modern fishes into a great variety of forms to fit every niche in the infinitely varied but unchanging environment of tropical seas, the shark has always been much as we find him today.

A FISH THAT UTILIZES A SHARK AS A TAXI

It is not surprising, therefore, that there is a fish which owes its very re-



Photograph by John Oliver La Gorce

PELICAN FISHERMEN RESTING BETWEEN TIDES: MOSQUITO INLET, FLORIDA

A dignified policeman-like bird is the pelican as he sails along with a wingspread of seven or eight feet. All dignity is cast aside, however, when his keen eye sights a fish, for he flops down from a considerable height and strikes the water with a crash and splash that should by all natural laws break every bone in his body, yet apparently never disturbs him. Recent investigations by the Biological Survey prove that instead of a wholesale consumer of valuable food fish, the pelican of our South Atlantic coast lives almost entirely on menhaden, a fish of comparatively little value.

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markable structure and habits to the presence of sharks. This is the slender Shark Sucker (Plate VI), which has the anterior portion of its body horizontally flattened, and a remarkable oval structure, with movable slats like those of a blind, on the top of its head. With this apparatus it attaches itself firmly at will to the shark's broad side and thus as a "dead head" passenger is transported through long stretches of ocean without any effort on its own part.

The Shark Sucker is boldly and very beautifully striped with black and white, but can change its color almost instantly to a dull, uniform gray matching the side of the shark to which it is clinging. It sometimes attaches itself also to other large fishes, such as the Tarpon, or to turtles.

A related species, the true Remora, is found clinging to those sharks which swim through the high seas far from shore. A third is found clinging about the gills of spearfish or marlin swordfish, as they are called by California anglers. A fourth, with very large and strong sucking disk, has been found attached to whales.

All of these may, loosely speaking, be called Remoras. They are sometimes erroneously spoken of as "Pilot-fish," for the Pilot-fish is an entirely different small species related to the Amber Jack, which swims in front of or alongside of sea-going sharks and is vertically banded with black.

THE REMORAS ARE ONE OF OCEAN'S MYSTERIES

Among the fishes of the world the Remoras occupy the position of a genius with unknown ancestry. There is nothing else like them, and to what manner of fishes they may be related is one of the mysteries of old ocean.

Fish life of the shallow pools so often found along a rocky shore at low tide will repay careful study. Such a pool may be a few yards long, with a very irregular outline, full of nooks and crannies, and a few square feet of sand covering its lowest point.

Here the young of several types of fishes act out in miniature the drama which their elders are playing on the reef. Only the villains of the play, the larger predaceous fishes, are absent, at least for the present, until the returning flood inundates the isolated pool to make it once more a part of the big salt water, and we retreat up the beach.

The stage setting is extremely simple: the jagged blackish bottom of the pool, small area of gray-white sand, a little patch of brownish seaweed in one place, either growing there or drifted in at the last high water. From a distance half a dozen small fishes are visible, swimming actively about.

Nearer view shows them to consist of two or three Sergeant Majors (Plate VIII), instantly recognized by the black and yellow uniform in vertical stripes; a couple of Beau Gregorys, with bright blue heads and yellow tails separated by a slanting line of demarcation, and a young Wrasse striped lengthwise with black on a pale ground.

THE WRASSE CHANGES ITS COLOR INSTANTLY

If one attempt to catch a fish of either of the former species, it displays great alertness and agility, dodging about the many projections and irregularities of rock. But now we have the Wrasse cornered and believe we have it in an instant, when suddenly it has disappeared.

Surely it did not dodge past and make good its escape in that way. Where can it be? Two or three minutes of careful scrutiny are rewarded. There it is, motionless, squeezed into a crevice of the side of the pool just large enough to hold it.

Swimming actively about, it was scarcely less conspicuous than the Sergeant Majors, but it has now, furthermore, changed color, so as to have a very low visibility in its sheltered nook. Here we have an illustration in detail of how various theoretical types of coloring work out. While swimming about with them the Wrasse had a conspicuous *immunity* pattern like the Sergeant Majors; now, in the twinkling of an eye, it is a concealingly colored fish.

THE SAND FLOUNDER DEFIES DETECTION

We have been speaking of fishes which no one will hesitate to admit are conceal-

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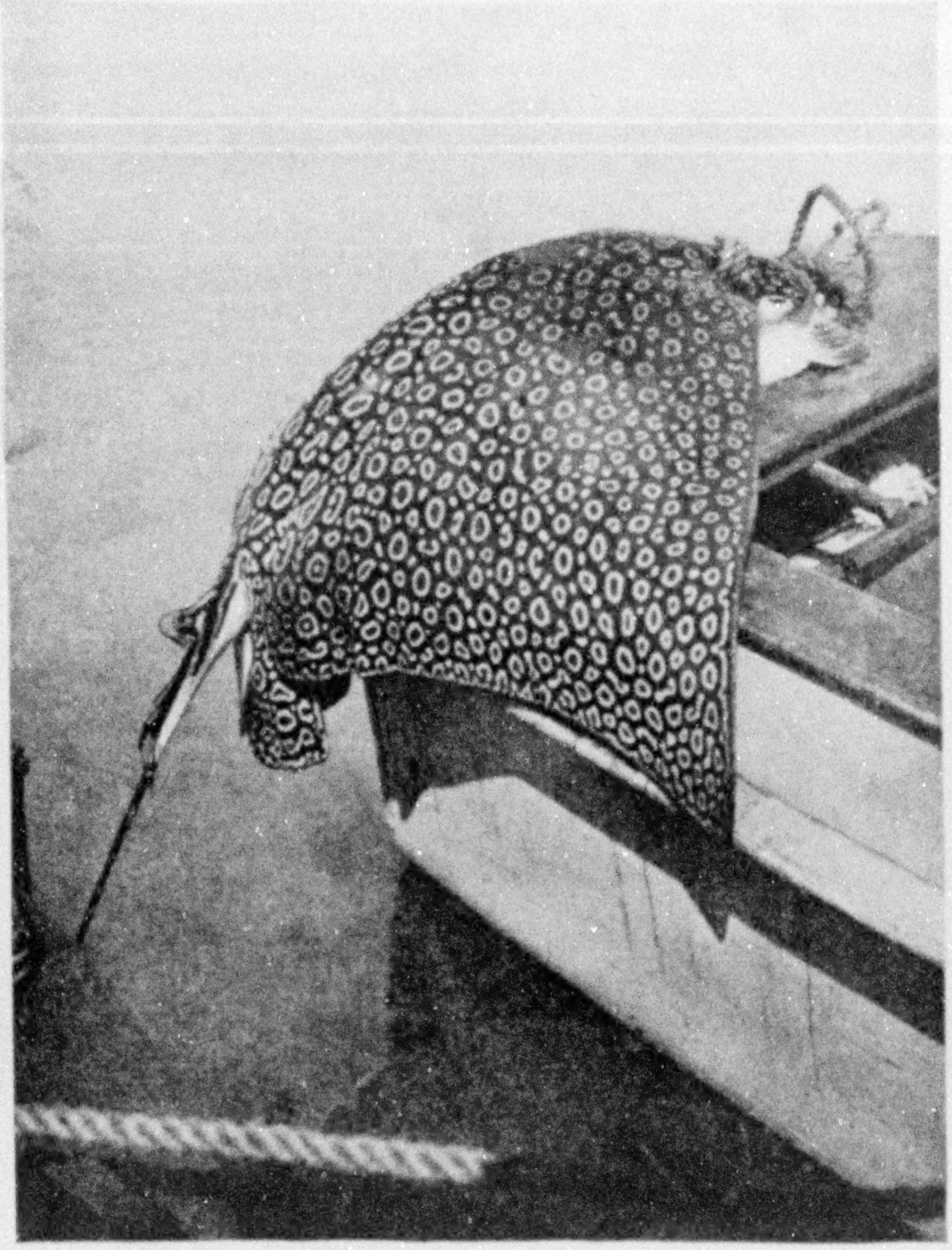

Photograph by John Oliver La Gorce

PROMINENT MEMBER OF THE NUMEROUS RAY FAMILY

The whip ray, or spotted sting ray, as he is also known, is now and then seen in the shallow waters adjacent to Miami. The ray uses its broad cephalic fins much as a bird its wings and seems to fly rather than swim through the water. It is beautifully marked with many golden-brown rings. It is not edible.

ingly colored; but, lying in plain view on the sand, there is a little pale-colored Sand Flounder so exceedingly inconspicuous that it is unlikely that we shall see it unless the water is drawn out of the pool and its inhabitants raked into our collecting bottles.

Even now the possibilities of such a pool have not been exhausted.

NOISY FISHES OF THE DEEP

One thinks of fishes as leading a life of perpetual silence down there under the waters. This generalization is not in all cases true, however. Lying anchored in a small boat at night in Florida waters, one may sometimes hear a school of sea-drum go swimming by below. "Wop, wop, wop," they seem to say. Then there is the little Trumpet-fish, so called, whose identity is open to question, technically speaking, that will at times lurk under the boat and intrigue you with its elfin tooting.

Many species utter croaking or grunting sounds when caught, the various species of grunts owing their name to this habit.

Grunts are fish somewhat resembling snappers in appearance and to a certain extent in habit, but smaller and less vigorous. They are variously and artistically colored in grays, blues, and yellows. The Blue-striped or Yellow Grunt (Plate VII) is yellow, with blue length-wise stripes. The Common Grunt has many narrow stripes of deep, clear blue on the head, the scales of the shoulder region enlarged and conspicuous, bronze in color, with grayish borders. The French Grunt is light bluish gray, with broad, undulating, irregular stripes of yellow; and there are many other varieties.

Grunts have bright red or orange color at the base of the jaws and inside the large mouth. The color is not visible when the mouth is closed.

So wonderful and varied are the fishes of our warm seas that one could write on and on about them did time permit; however, in a later issue of THE GEOGRAPHIC will appear another and more extensive color series of the brilliant fish of the Gulf Stream.

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EVERY-DAY LIFE IN AFGHANISTAN

By Frederick Simpich and "Haji Mirza Hussein"

The following article is based upon the observations of "Haji Mirza Hussein" during his stay in Kabul as the guest of the Amir of Afghanistan and upon information gathered during his caravan travels throughout the country. Haji Mirza Hussein is a pseudonym adopted by this European observer, whose mission was of both political and military significance; hence the compulsion to travel in the disguise of a Persian pilgrim. Mr. Simpich, who has translated and edited these notes, was formerly United States Consul at Bagdad and has traveled extensively through south Persia and India.

THE BUFFER State of Afghanistan, historic shock-absorber between Great Britain and Russia in middle Asia, years ago put up a "Keep Out" sign, a "This Means You" warning, to all white men and Christians. The land is "posted,"—to use a poacher's phrase—posted against trade and concession hunters, against missionaries, and against all military and political hunters in particular.

Time and again the British have pushed up from India to invade this high, rough region hard by the "roof of the world." More than once their envoys have been massacred or driven back, or imprisoned, with their wives and children, in the frowning, gloomy citadel of Kabul; and once a retreating white army "shot it out" almost to a man, scattering its bones all the way from Kabul back to the Indian frontier.

THE "KEEP OUT" SIGN IS STILL UP

In sheer drama, in swift, startling action, in amazing, smashing climax, no chapter in all the tales of the romantic East is more absorbing than this story of Britain's wars with the Afghans. And Russians, too, in the splendid glittering days of the Tsars, waged their fierce campaigns from the North, over the steppes of Turkestan, with wild Cossack pitted against wary Afghan.

But the "Keep Out" sign is still up. Today the foreigner is no more welcome in Afghanistan than he was a hundred years ago. Forbidden Lhasa itself is no more exclusive than brooding, suspicious Kabul, the capital of this isolate, unfriendly realm of fanatic tribes, of rocks, deserts, irrigated valleys, and towering unsurveyed ranges (see pages 86-87).

No railways or telegraph lines cross this hermit country or run into it, and its six or seven million people are hardly on speaking terms with any other nation.

Night and day, from stone watch-towers and hidden nooks along the ancient caravan trails that lead in from India, from Persia and Russia—trails used long ago by Alexander and Jenghiz Khan—squads of bearded, turbaned Afghans, with imported field-glasses and long rifles, are keeping watch against trespassers from without.

For reasons of foreign policy, the Amir has long felt the necessity of secluding his little-known land to the greatest possible extent from the outside world. Only a few Europeans, mostly British, but occasionally also an American and now and then a few Russians or Germans, have had permission to come into this country and to sojourn for a while in its curious capital. But even on such rare occasions as when a foreign engineer, or a doctor whose services are badly needed, is admitted by the grace of the Amir, the visitor is subject to a surveillance that amounts almost to imprisonment.

No ambassadors or ministers, not even missionaries, are permitted to reside in this forbidden Moslem land. "Splendid isolation" is a sort of Afghan tradition, a conviction that the coming of the foreigner will spell the end of the Amir and his unique, absolute rule.

THE AMIR NEVER WALKS

Today no other monarch anywhere wields such undisputed authority or is in closer touch with the every-day life of his subjects. He personally runs his country's religion, its foreign affairs, and

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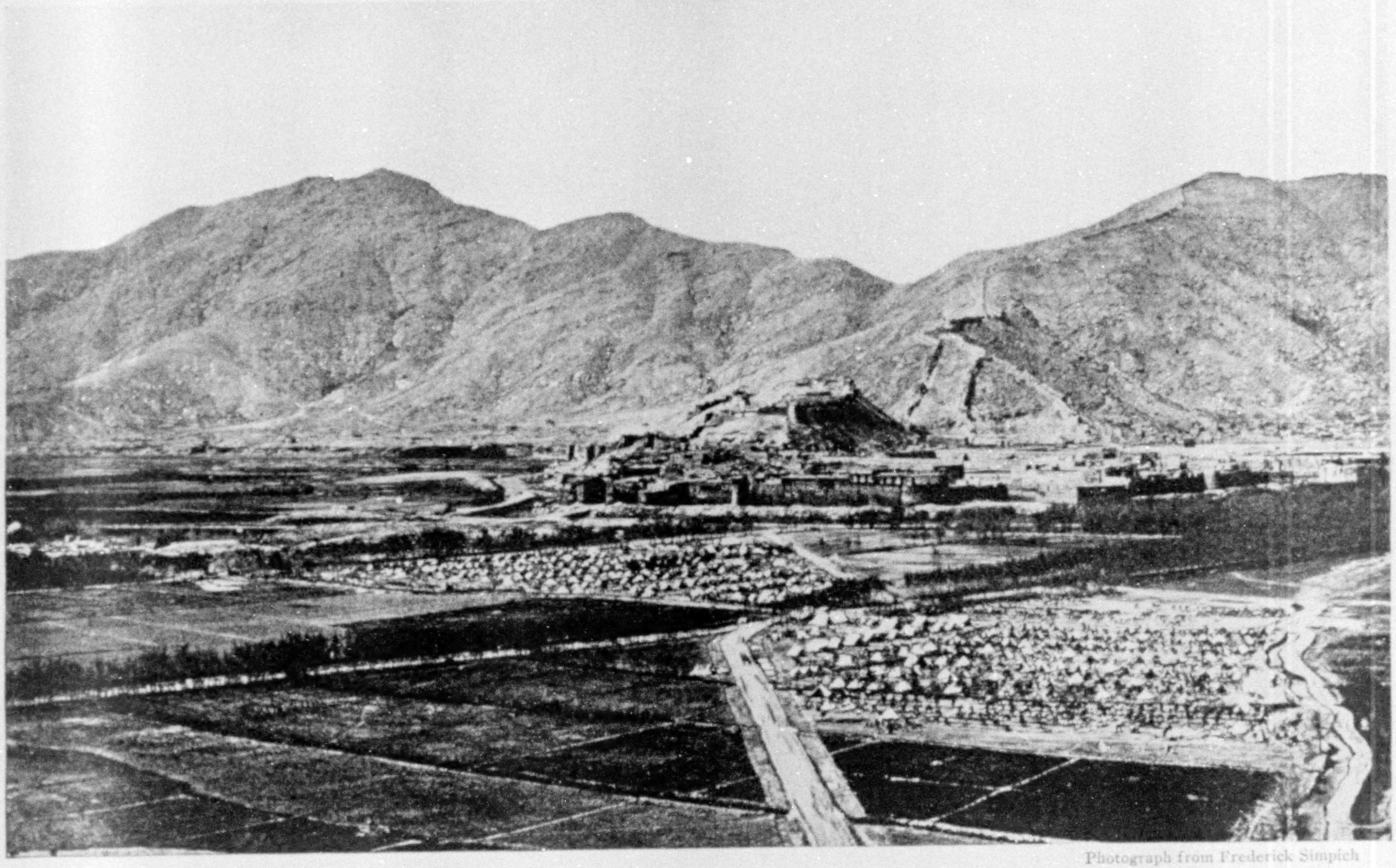

Photograph from Frederick Simpich

THE GREAT CITADEL OF KABUL, CAPITAL OF AFGHANISTAN

This is one of the most famous old fortresses in all Asia. The wall, which is in ruins, runs back over the mountain. There is a fairly good hospital in Kabul, over which presides a Turkish physician. The Amir has also invited several Indian physicians to make their homes in his capital. In the summer many residents of Kabul live in tents.

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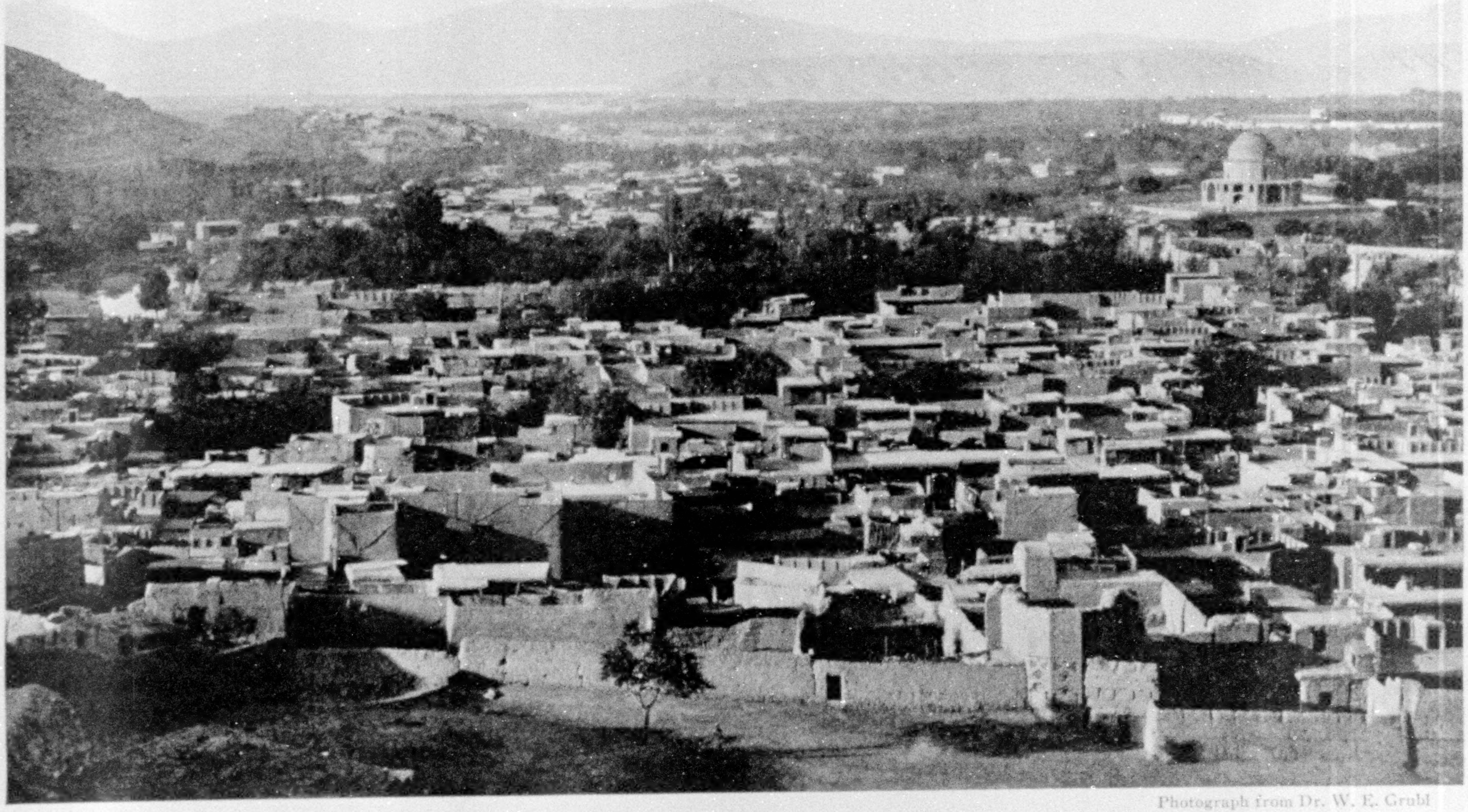
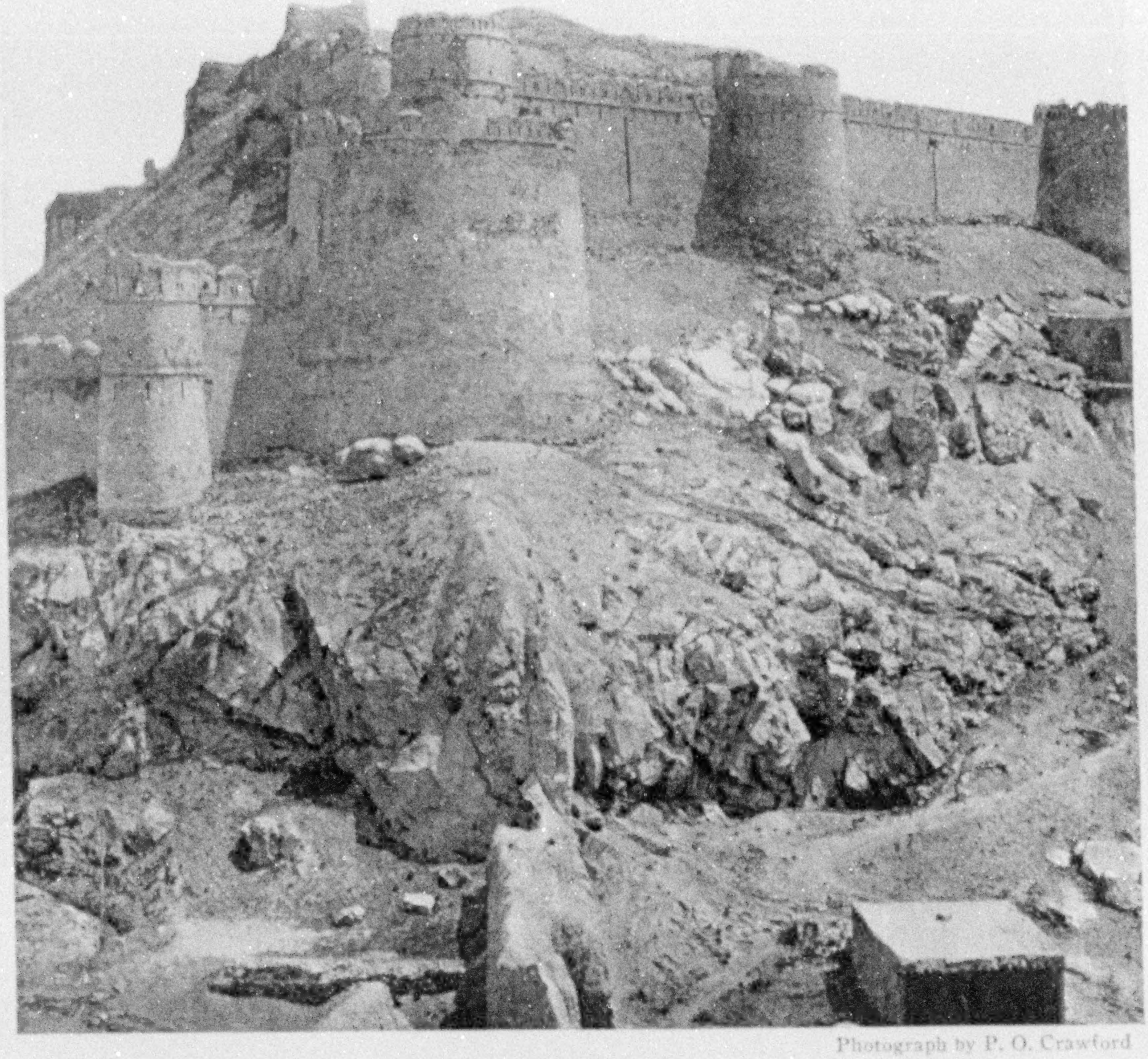


Photograph from Dr. W. E. Grubl

A GENERAL VIEW OF KABUL AND THE BEMARU HEIGHTS, WHERE A BRITISH ARMY OF OCCUPATION WAS STATIONED IN 1840

Kabul is situated on the river of the same name, at an elevation of nearly 7,000 feet above sea-level. Its population is variously estimated at from 60,000 to 180,000. It commands all the passes from the north through the Hindu Kush, and through it have passed the successive armies of invasion led by Alexander the Great, Jenghiz Khan, and other conquerors on their way to India.



Photograph by P. O. Crawford

THE FORT OF BALA HISSAR, WHICH CROWNS A HEIGHT OF 150 FEET, COMMANDING THE PLAIN ON WHICH IS BUILT THE CITY OF KABUL

The Bala Hissar was partially destroyed forty years ago by the Amir Abdur Rahman. It has never been restored.

he even supervises much of its commerce. He also owns and censors the only newspaper printed in all Afghanistan. Incidentally, he keeps 58 automobiles, and he *never* walks. Even from one palace to another, he goes by motor over short pieces of road built especially for his pleasure.

From the World War, though he took no active part in it, the Amir emerged with singular profits. His old and once rival neighbors, Great Britain and Russia, drawn together as allies in the world conflict, left him a free hand, and in 1919 Great Britain officially recognized the political independence of this much-buffeted buffer State, to whose rulers she had so long paid a fat annuity.

With an area of 245,000 square miles, Afghanistan is, next to Tibet, the largest country in the world that is practically closed to the citizens of other nations. But political life at wary, alert Kabul is in sharp contrast to the meditative seclu-

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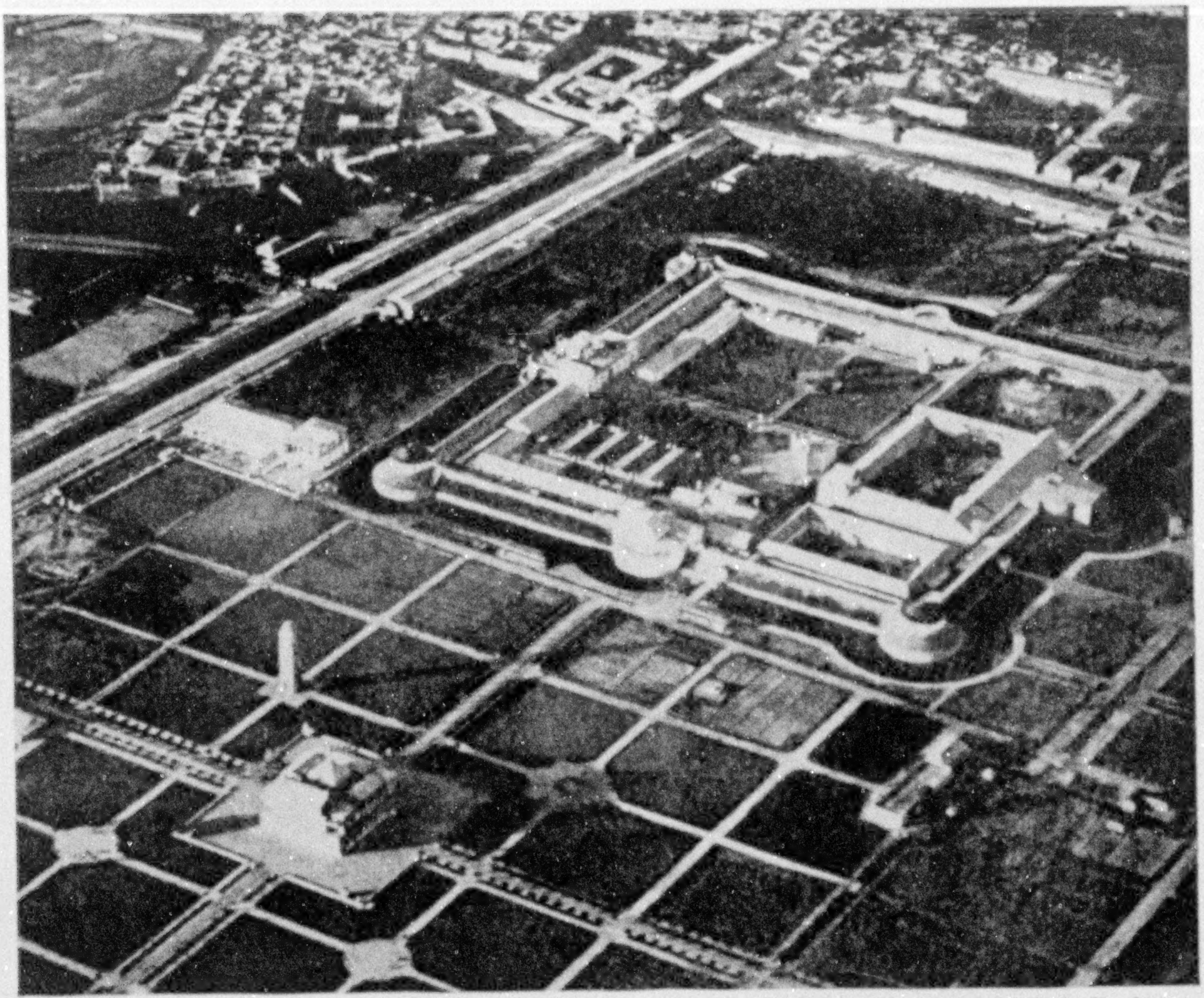


Photograph courtesy Air Commodore L. E. O. Charlton

AN AIRPLANE VIEW OF THE AMIR'S PALACE AT KABUL: AFGHANISTAN

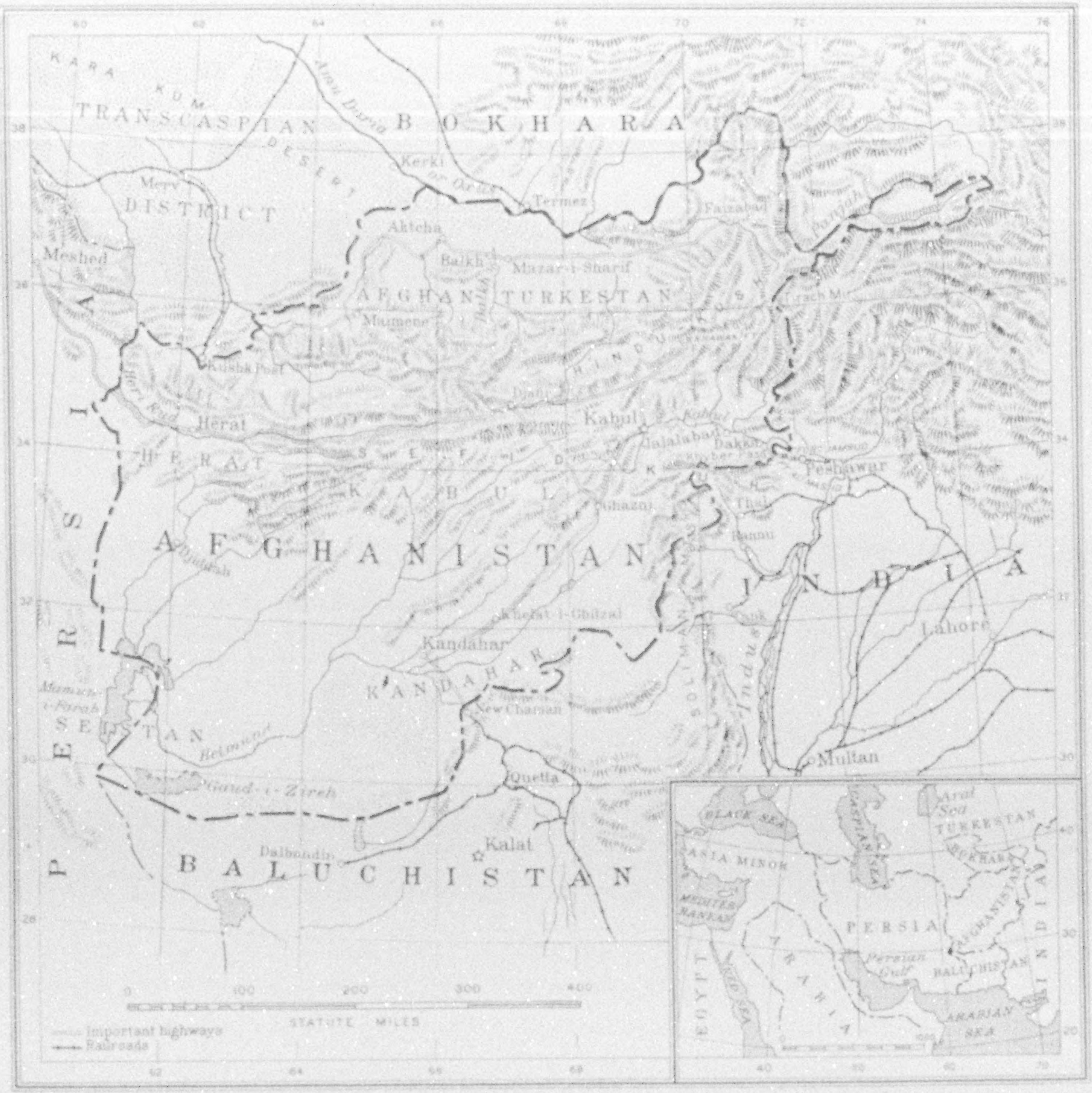
The Amir has neither airplanes nor radio stations in his military establishment, but he knows a flying-machine when he sees it, for the British flew up from India during the Anglo-Afghan "unpleasantness" in 1919 and dropped a few persuasive bombs in the vicinity of the city.

sion and classic aloofness of the pious lamas at Lhasa. Amir Amanullah Khan, through his agents in India and elsewhere, is in close touch with the world's current events; and, as the last remaining independent ruler of a Moslem country, now that the power of the Caliph at Stamboul is broken, he wields a far-reaching influence throughout the Mohammedan world; also, because his land happens to lie just as it does on the map of the world, it is plain that for a long time to come he will be an active force in the political destinies of middle Asia. Like Menelik of Abyssinia, Queen Lil of the Hawaiian Islands, or the last of the Fiji kings, this Amir, remote and obscure as his kingdom is, stands out in his time as a picturesque world figure.

The Amir's word, his veriest whim, is law to his millions of subjects. He is, in truth, the last of the despots, a sort of modern Oriental patriarch on a grand scale. His judgments are, of course, based primarily on the Koran, or on the common law of the land; for there is no statute book, no penal code, and no court.

HIS WORD MEANS LIFE OR DEATH

To keep the wires of politics, of military and economic control, in his own hands, the Amir vests subordinate authority only in his relatives and close friends; and woe betide the incautious underling who dares think for himself or act contrary to the Amir's wishes; for in this primitive, secluded region there still survive many unique and startling methods of "rendering a culprit innocuous."


KARA KUM
TRANSCASPIAN
DESERT
BOKHARA
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Termez
Merv
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Meshed
Aktcha
Balkh
Mazar-i-Sharif
Faizabad
AFGHAN TURKESTAN
Maimena
Kushk Post
HINDU KUSH
Herat
Kabul
Jalalabad
Dakka
Khyber Pass
Peshawar
HERAT
SEFID KOH
KABUL
Ghazni
Thal
Bannu
AFGHANISTAN
INDIA
Helmand
Khelat-i-Ghilzai
Kandahar
KANDAHAR
Lahore
New Chaman
Indus
SULIMAN
SEISTAN
Helmund
Gaud-i-Zirreh
Quetta
Multan
Dalbandin
Kalat
BALUCHISTAN
PERSIA
STATUTE MILES
Important highways
Railroads
BLACK SEA
ASIA MINOR
CASPIAN SEA
Aral Sea
TURKESTAN
BUKHARA
MEDITERRANEAN
PERSIA
AFGHANISTAN
EGYPT
ARABIA
Persian Gulf
BALUCHISTAN
INDIA
RED SEA
ARABIAN SEA

Drawn by A. H. Bumstead

A MAP OF AFGHANISTAN AND ITS BORDER LANDS

Afghanistan has an area equal to twice that of the State of New Mexico, and has a population variously estimated at from 6,000,000 to 7,000,000. The inaccessibility of the country is due to its distance from the sea, its inhospitable sands, and the lofty mountain fastnesses which almost encircle it.

The Amir reserves to himself the right of passing death sentences. The cruel Afghan forms of punishment, such as shooting a prisoner from the cannon's muzzle, sabering off his head, stoning him to death, burying him alive, cutting off his hands and feet or putting out his eyes, are seldom employed nowadays; yet often the criminal himself will choose a quick, though violent, exodus to paradise rather than suffer long imprisonment in a filthy iron cage, perhaps to die eventually of starvation.

The way of the transgressor in Afghanistan continues to be uncommonly hard, however. Time and again, in the recorded history of this land, deposed amirs, troublesome relatives, and political enemies have been deliberately blinded, there being a tradition here that no man with any physical affliction may hold a public office of honor or profit.

CARAVANS OF 120,000 ANIMALS ENTER AFGHANISTAN

Politically, Afghanistan is divided into four provinces: Afghan Turkestan, Kabul, Kandahar, and Herat. Topographi-

Photograph by P. O. Crawford

THE AMIR'S CLOCK TOWER IN KABUL, CONSTRUCTED BY EUROPEANS IN 1913

Clocks of all kinds, particularly those with alarm bells, cuckoos, and musical attachments, are popular in Afghanistan, but time itself is no object here. An audience with the Amir often lasts from 9 o'clock in the morning till late at night, interrupted by a long, ceremonious repast.

cally, its most conspicuous features are the high peaks in the northeast; where it touches the great Hindu Kush, the Tirach Mir attains a height of over 23,000 feet.

Through these mountains of northeast Afghanistan wind some of the most picturesque and historic trails of the whole world. For centuries the trade between Turkestan and India has flowed over these high passes, and the story goes that often these annual caravans number as many as 120,000 loaded animals, including camels, mules, and horses.

Alexander the Great founded Herat and Kandahar, and here and there are ruins and monuments that mark the marches of the ancient Greeks through the valley of Kabul, of Loghar and Bactra.

At Aibag and elsewhere in Afghanistan are also found the crumbling ruins of Zoroastrian fire temples, the best preserved of which is probably the "Tup-i-Rustam" ruin at Balkh. Near Tacht-i-Rustam, also, several prehistoric caves have been found, their walls decorated with carvings of giant sunflowers.

The city of Balkh, like Babylon, apparently lived through three or four different civilizations; its ruins show that one city after another has occupied this site, each one being built above the ruins of its predecessor.

Among the oldest ruins in existence are these fire temples in Afghanistan.

A BABEL OF TONGUES AND RACES

Afghanistan is a Babel of races and tongues; more than half its population are not Afghans at all. The majority group embraces the Iranian-Aryan Tadjiks, who inhabit the settlements and large towns; the Mongolian Hazarahs, who roam the mountainous central regions of the country, and the Turkomans and Uzbegs of northern Afghanistan. The real Afghans, or "Pahtos" (Pathans), as they call themselves, live in the high ranges stretching from the Solimans past

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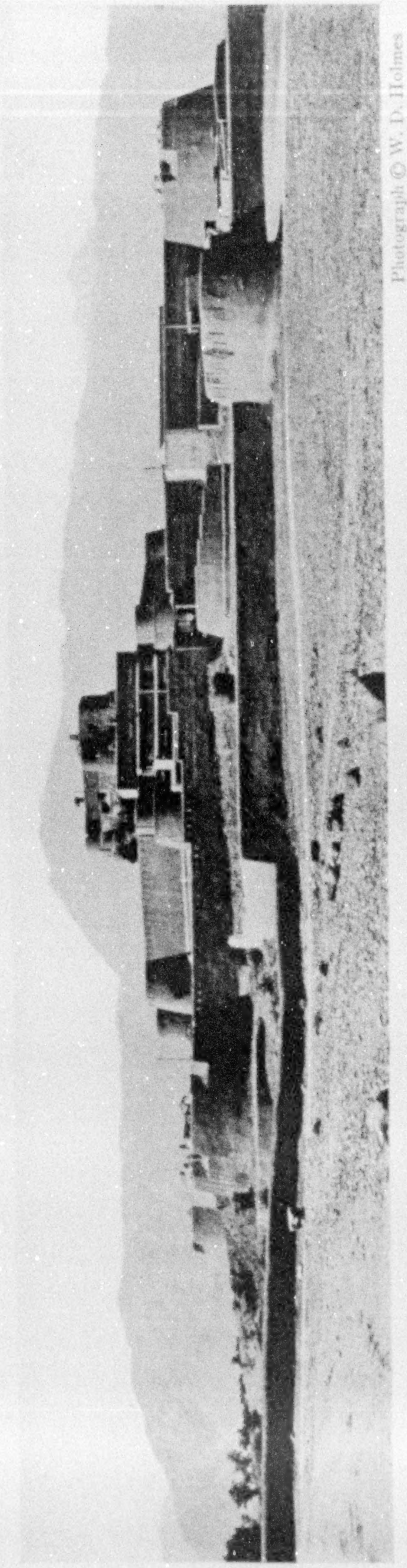


Photograph © W. D. Holmes

FORT JAMRUD, WHICH COMMANDS THE INDIA TERMINUS OF THE FAMOUS KHYBER PASS (SEE PAGE 108)

Beginning at Jamrud, 10½ miles west of Peshawar, the pass twists through the hills for 33 miles in a northwesterly direction, terminating at Dakka, in Afghanistan.

Ghazni and Kandahar to the west, toward Herat.

Authorities differ as to the exact origin of the Afghans, but the old theory that they are of Semitic extraction is now discredited; it seems more probable that they are merely a mixture of Turanian tribes, developed here through many centuries of raids, migrations, and tribal changes.

In physical appearance the Afghan is a sort of Turco-Iranian type, the minor tribal divisions in the east of the country showing also a mixture of Indian blood. (The name "Afghan," or "Agwan," is of comparatively recent usage.)

The tribes are divided into minor clans, called "Khel," and they live almost entirely off their herds of cattle, camels, and sheep. Here, as in India, deaths from snake-bites are numerous; scorpions and tarantulas also enliven the nomad's life, and in winter the felt-floored tents are alive with vermin. Few real Afghans are found in the settlements or towns; they instinctively cling to the wild, free life of the open ranges.

War is the chief occupation of all these tribes; they constantly quarrel among themselves and seldom intermarry.

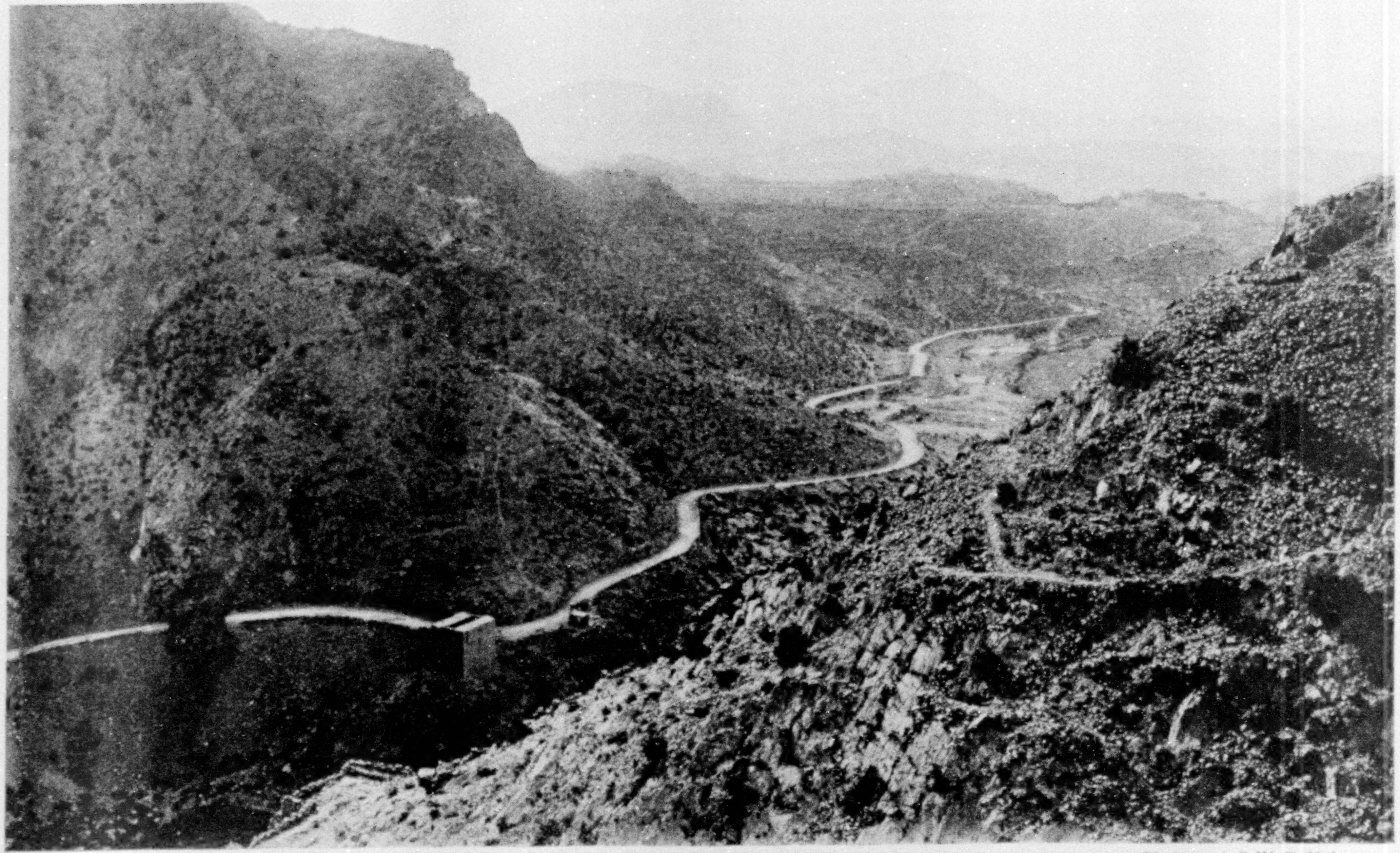
PERSIAN CULTURE HAS MOLDED AFGHAN SOCIAL LIFE

Though the language of the Afghan originated from the old Iran idiom, it shows now the mark of Indian influence. In writing, the Afghan uses a sort of Arab character—that is, one of those alphabets which as children we used to call "fishworm letters." His meager literature, modeled after the poetry of Persia, is also influenced by Islam.

Persian culture has molded the social life in Afghanistan through centuries; notwithstanding the religious hatred between the Sunnis and the Shias, Persian customs have been more or less adopted in the upper ranks of all middle Asiatic Moslem society.

From the Persians the Afghans got the idea of marrying more than one wife; but, like the Persians, too, they have found, to their dismay, that polygamy is nowadays more expensive than exciting.

Sometimes, when the Amir wants to favor his faithful officials with presents,



Photograph © W. D. Holmes

A VIEW OF THE KHYBER PASS FROM ALI MASJID, LOOKING TOWARD AFGHANISTAN

The trade between India and Afghanistan is borne on camels and mules, which travel in caravans, but during the extremely hot summer months, when the temperature often rises to 118° in the shade, it is found that mules endure the heat and hard work much better than camels.

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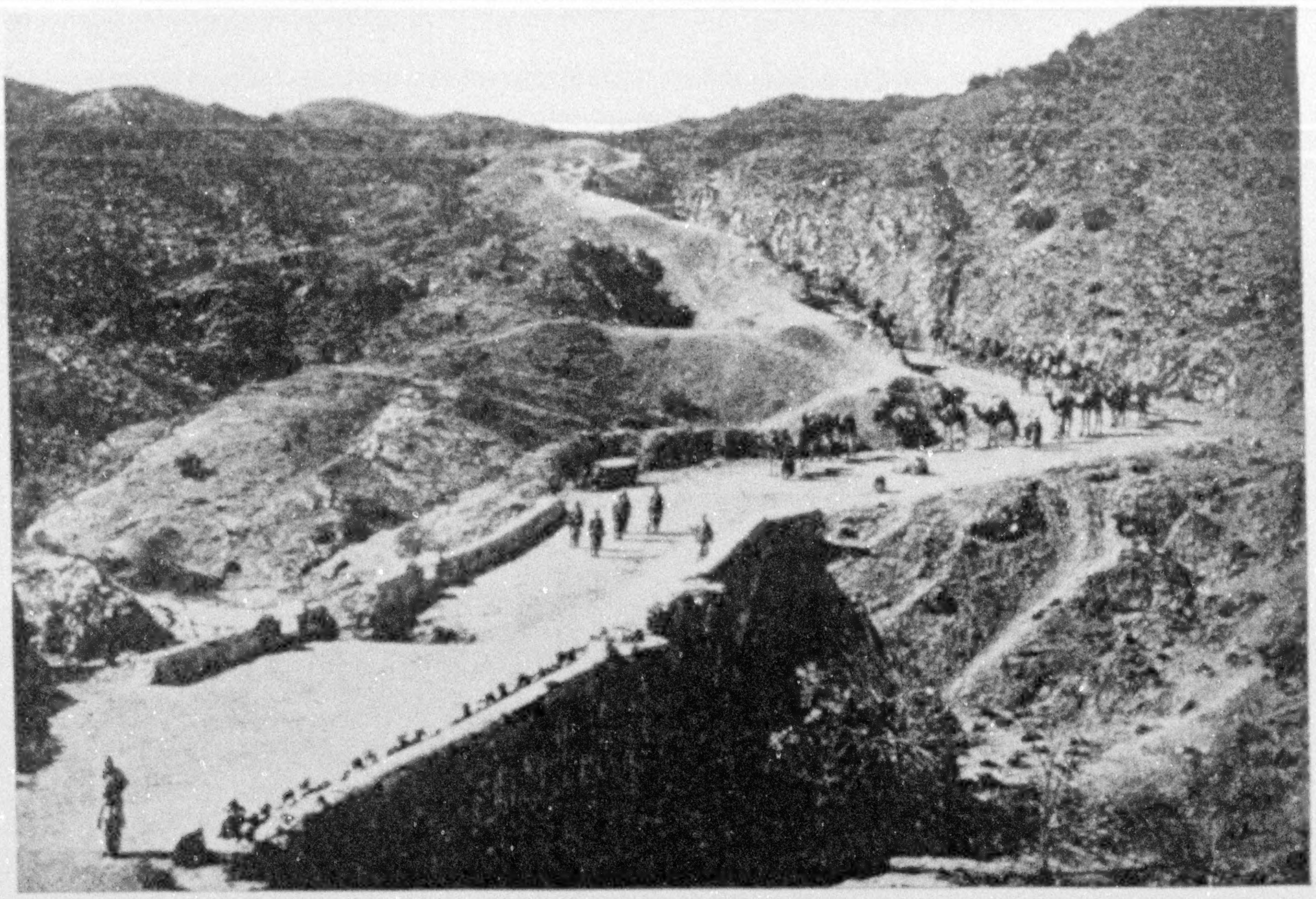
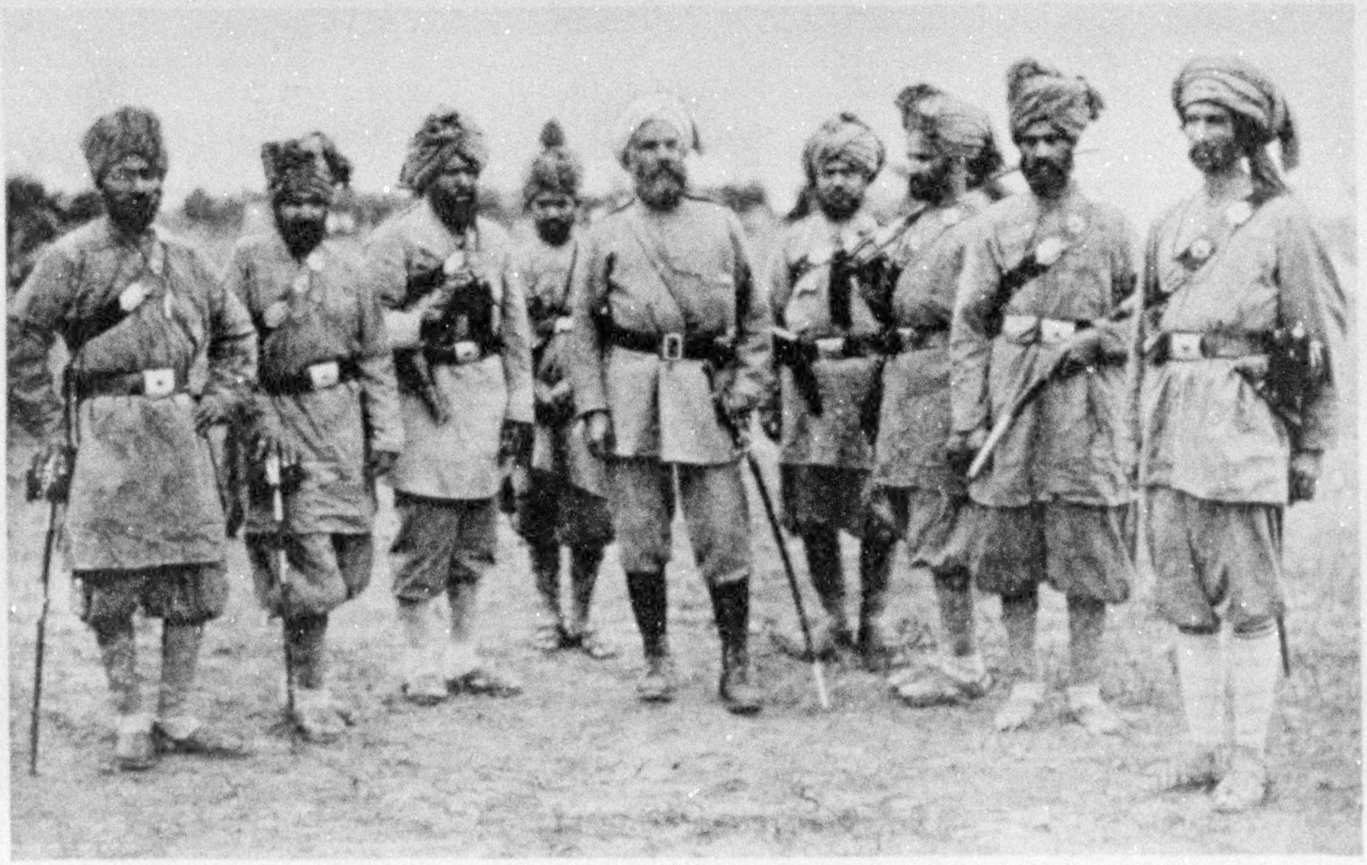


A CARAVAN IN THE KHYBER PASS

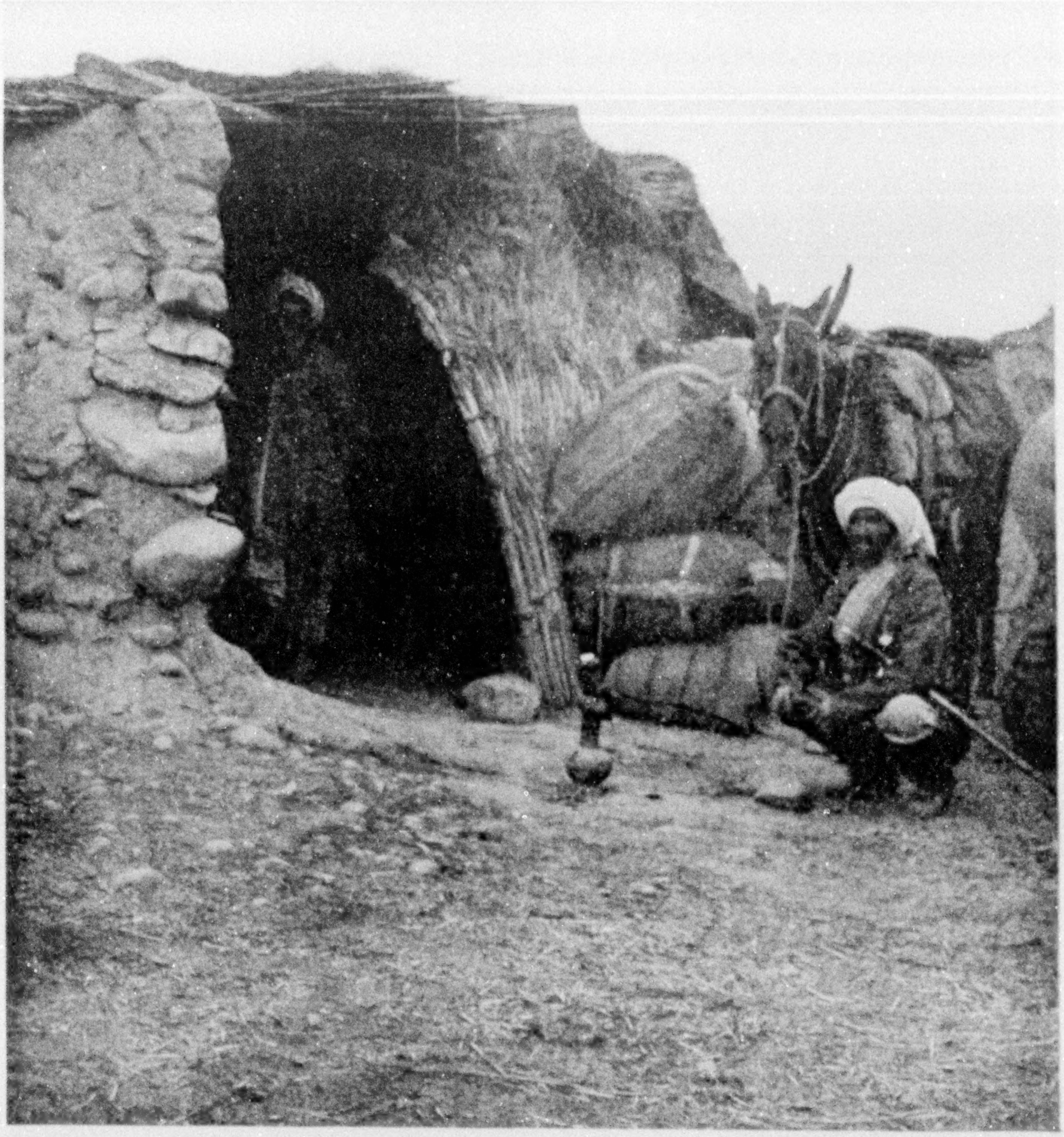
In the morning this pass is open to caravans coming into Afghanistan, while in the afternoon those bound for India have the right of way.



Photographs by Haji Mirza Hussein

TYPES OF INDIAN SOLDIERS RECRUITED BY THE BRITISH TO GUARD THE AFGHAN FRONTIER

"The Khyber Rifles" is one of the most famous military organizations of the British service in India. The two battalions, commanded by British officers, are recruited from members of the Afridi tribe.



Photograph by P. O. Crawford

AN AFGHAN POST-OFFICE ALONG THE ROAD FROM JALALABAD TO KABUL

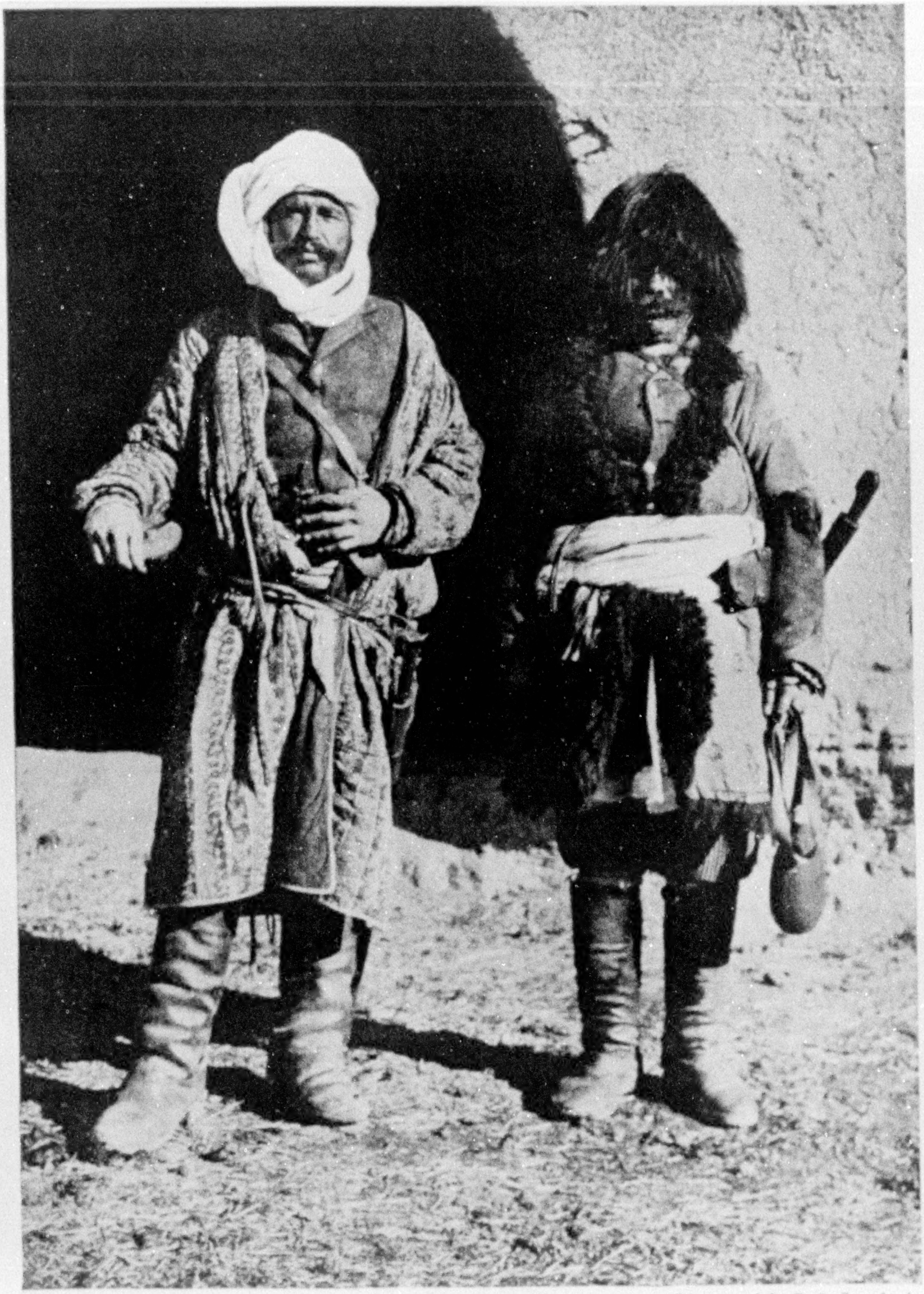
If an American wishes to write to a friend in Afghanistan, he must address his letter in care of the Afghan postmaster, Peshawar, India, who will forward it to its destination in the Closed Kingdom. The amount of postage must either be deposited with the Afghan postmaster at Peshawar or paid by the recipient. Letters are dispatched by runners twice a week and require three days for delivery between Peshawar and Kabul. Newspapers, books, and bulky packages are held in Peshawar until they can be dispatched conveniently in batches on horseback.

or perhaps to play practical jokes in certain cases, he distributes women among them; but these "gifts" often prove so troublesome that no great degree of gratitude is apparent among the recipients.

BOYS OF FOURTEEN MARRY GIRLS OF TEN

Family life, however, seems to be rather more intimate and private in Afghanistan than in Persia. Usually the young Afghan does not see his bride before the day of the wedding. Female relatives conduct the preliminary skirmishes, a sort of courtship by proxy which is later followed by negotiations between the bridegroom and his future father-in-law.

Marriage is celebrated at a very early



Photograph by P. O. Crawford

AFGHAN GUARDS ON THE ROAD BETWEEN JABUL-US-SIRAJ AND JALALABAD

Although the influence of the Amir of Afghanistan is far-reaching and his authority is absolute, many of the outlying tribes enjoy a measure of independence. Such tribes and their villages are still presided over by their chiefs, called Khans, Malaks, or White Beards. These chiefs are chosen for life. Second-hand uniforms are among the principal articles of import into the land of the Amir.

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age, especially in the northern parts of the country, where boys of fourteen marry girls of not more than ten or twelve years of age.

Amir Habibullah Khan (who was assassinated in 1919) had a harem of over 100 women, and among these, strangely enough, were a few Europeans. The present Amir, Amanullah Khan, has but one wife.

The women of Afghanistan are kept in more rigid seclusion and are more closely veiled than the women of any other Moslem land. The Afghan is notoriously jealous of his harem, and few indeed are the men of the outside world who have ever looked on the face of an Afghan woman of the towns. With the desert women, wives and daughters of the nomads, it is different; the Koran permits them to go unveiled.

AFGHAN WOMEN ARE NOT TAUGHT TO READ OR WRITE

Like the Arab, the Afghan considers it unnecessary and even unwise that women should learn to read or write. No girls are admitted to the bazaar schools and no mullahs are employed to teach them, and Afghanistan knows nothing of women teachers.

In spite of their illiteracy, however, many individual Afghan women wield no little influence in tribal affairs, and, as a rule, the wives of the upper classes lead a comfortable and apparently happy life. They are lavishly provided with every luxury of food and dress which Afghan means can afford, and they visit constantly from one harem to another to gossip, sing, and play games. To be left childless is counted life's saddest misfortune.

About the time the little girls of the family put on their veils, the boys of the same age must begin their studies. First of all, a boy is taught to ride; then to hunt and shoot. The horse is the Afghan's constant companion.

The education of middle and lower class boys is in charge of the mullahs, or teachers. Usually a shabby house or convenient nook in the bazaar is utilized as a school-room, the boys sitting on the floor and studying aloud. The pupils are often surrounded by an interested group of long-haired, wild-looking camel-drivers or visiting nomads.

The government contributes nothing to maintain public schools. Often the better families send their sons to be educated at universities in India.

Few Afghans have acquired any considerable knowledge by travel in other countries.* The late Habibullah Khan probably surpassed all his subjects in intellectual attainments, for he had specialized in history and the sciences. Next to him, the most educated Afghan of today is the editor of the only Afghan newspaper, the *Saradj-ul-Akhbar*. This editor, who has traveled much in India and Turkey, is at the present time also holding the position of Minister of Foreign Affairs.

The longest journey any Afghan has ever undertaken was made by Nasrullah Khan, the brother of the murdered Amir, who traveled to England in 1895.

The present Amir has never left his country; his brother, however, has been in India several times. Yet, on the whole, an eager desire for learning is innate in every Afghan, and of late years not only Indian, but also British, culture and customs have begun to influence the better classes of the people.

The Afghans call their language "Pushtoo." For official matters, however, the Persian idiom is used and understood over most of the country. The Turkish and Mongolian tribes in western and central Afghanistan speak their own tongues. The ruling Amir knows Persian, some Pushtoo, and Turkish.

THE AMIR LOVES PICTURES AND IS A GOOD AMATEUR PHOTOGRAPHER

Foreign newspapers, most of them coming from India, are most carefully read at the Amir's court, where they are translated by hired students trained in India. The Amir delights in illustrated newspapers and is himself a fairly good photographer.

The Afghan works no more than is absolutely necessary to make his living. The upper classes consider it their privi-

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* The only considerable group of Afghans who seem ever to have gotten far from home is a colony of men taken to Australia some years ago for handling camel caravans on the Australian deserts.

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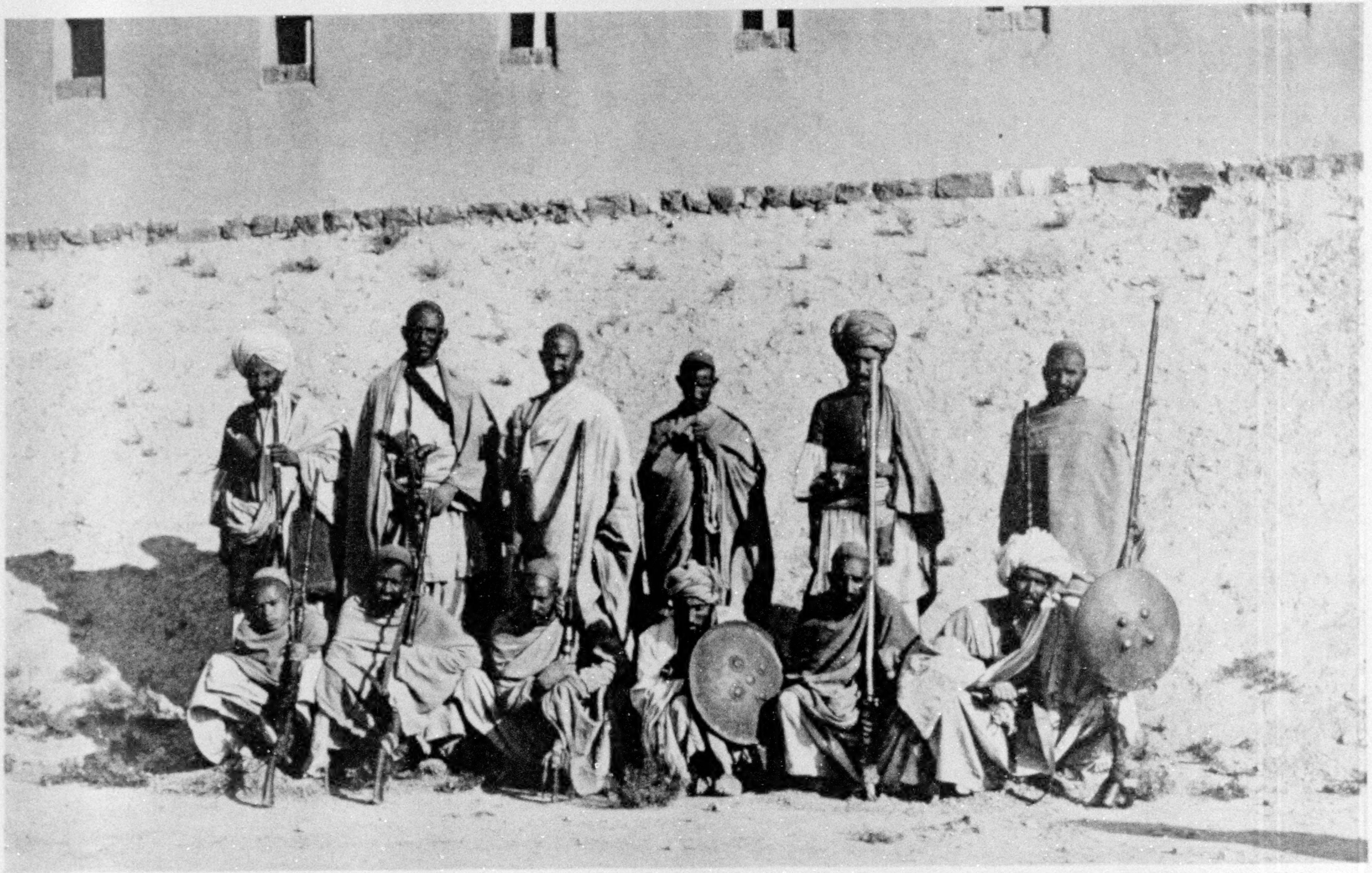

Photograph © W. D. Holmes

A GROUP OF AFRIDIS WITH THEIR PICTURESQUE RIFLES AND SHIELDS

The Afridis are said to have Israelitish blood in their veins. In fact, the Afghans claim to be descended from King Saul, and declare that they were among the people carried away captive from Palestine by Nebuchadnezzar. The whole of the Khyber Pass lies within the country of the Afridis.

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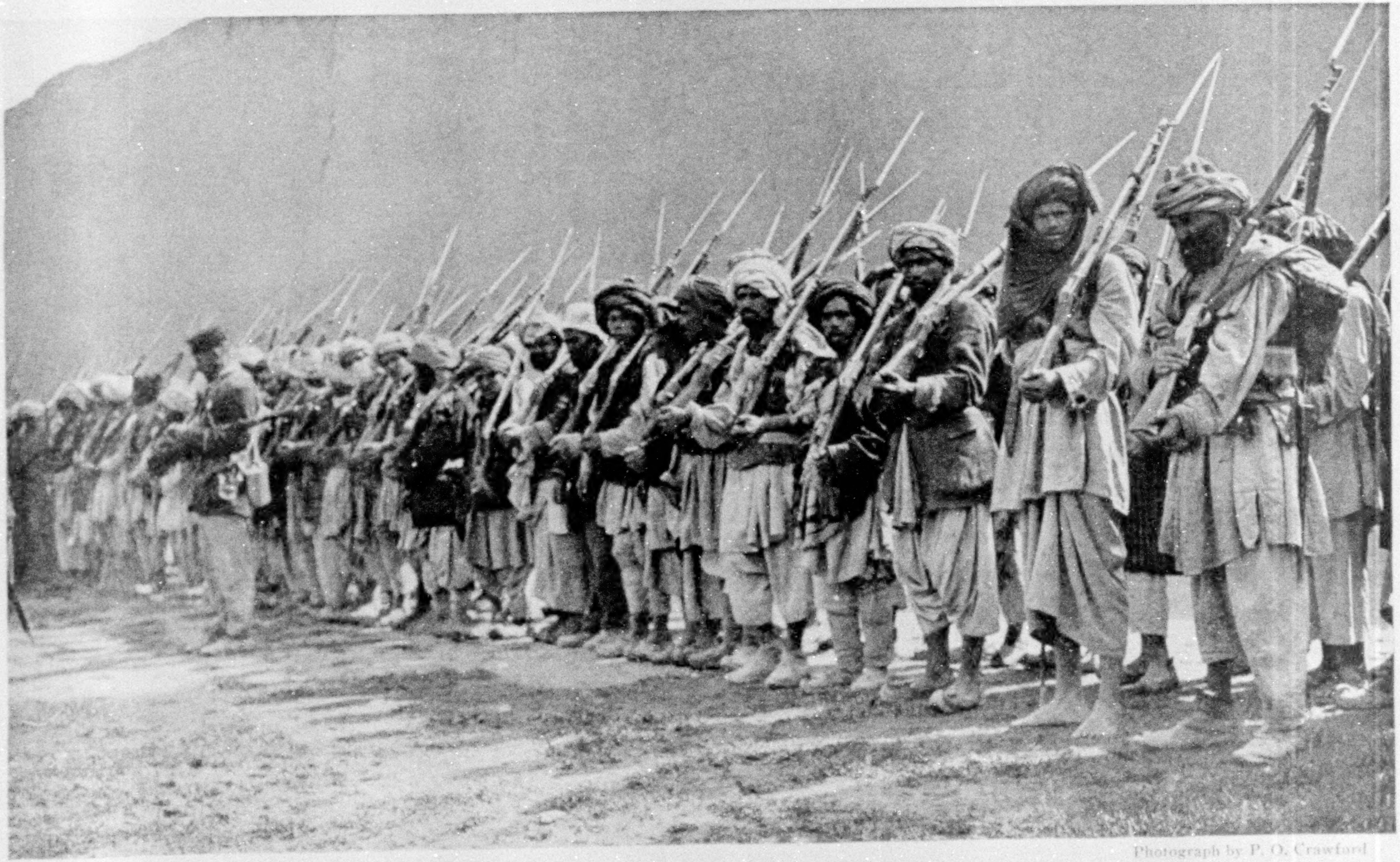
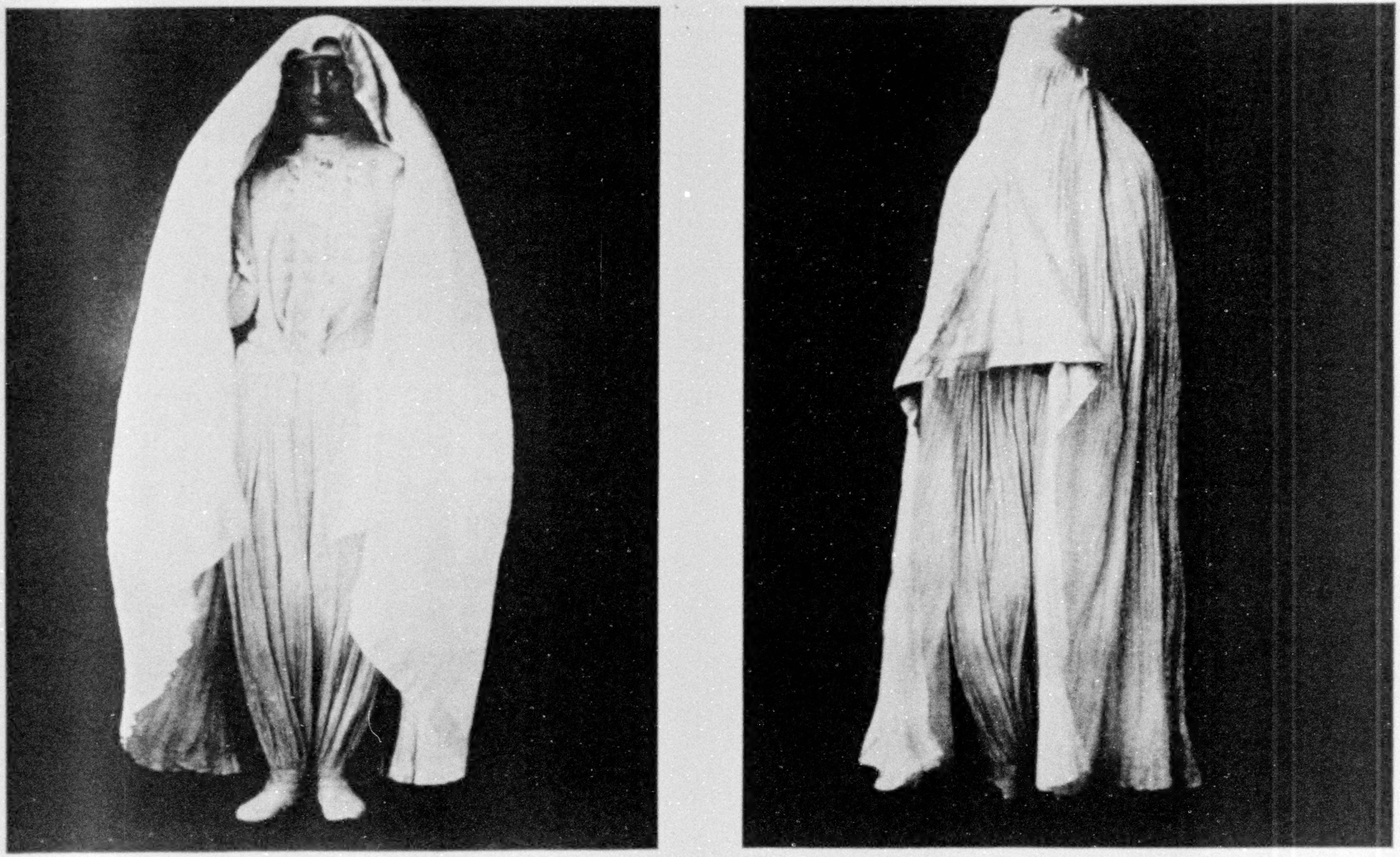


Photograph by P. O. Crawford

A COMPANY OF AFGHAN INFANTRY UPON ITS RETURN TO KABUL AFTER A PUNITIVE EXPEDITION AGAINST SOME OF THE AMIR'S REBEL SUBJECTS

The real military strength of Afghanistan rests not so much upon the shoulders of its poorly organized and indifferently equipped regular army, but upon the inhospitable character of the country itself, the scarcity of roads, and the aptitude of the inhabitants for guerrilla warfare.

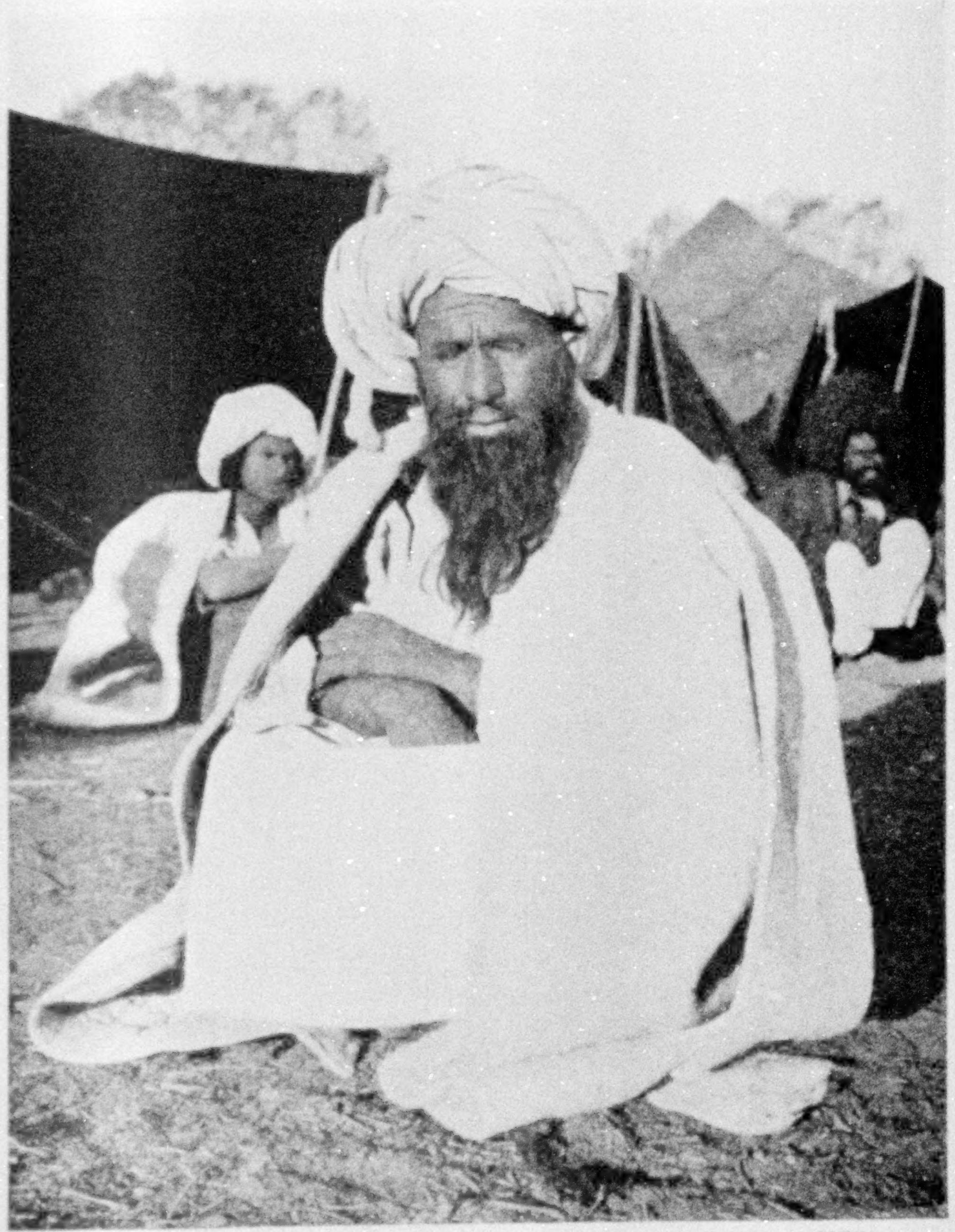


Photographs by Haji Mirza Hussein

FRONT AND REAR VIEWS OF THE COSTUME OF AN AFGHAN WOMAN OF THE UPPER CLASSES

As no Afghan woman would ever consent to have her photograph made without the veil, these costume pictures were posed for the photographer by an English woman at one of the Indian frontier posts. The women of the poorer classes wear cotton bloomers, slippers, and a cotton tunic.

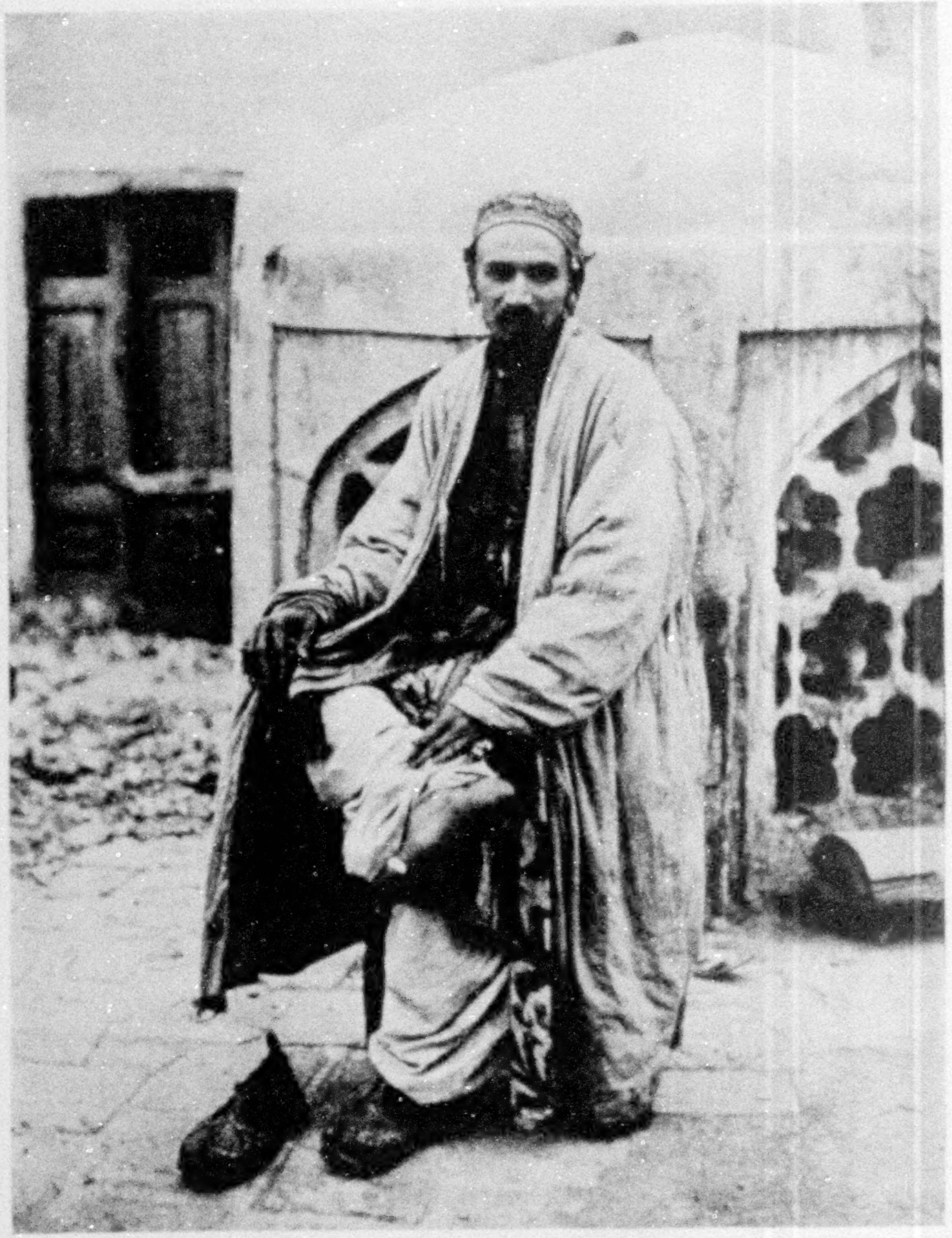
The wealthy Afghan woman wears a round cap embroidered with gold thread. The hair, parted in the middle, is arranged in tiny braids caught in a black silk embroidered bag worn under the gold cap. Married women wear a fringe of hair, often curled, on each side of the face.



Photograph by Maynard Owen Williams

AN AFGHAN CHIEF WEARING HIS WHITE FELT CLOAK

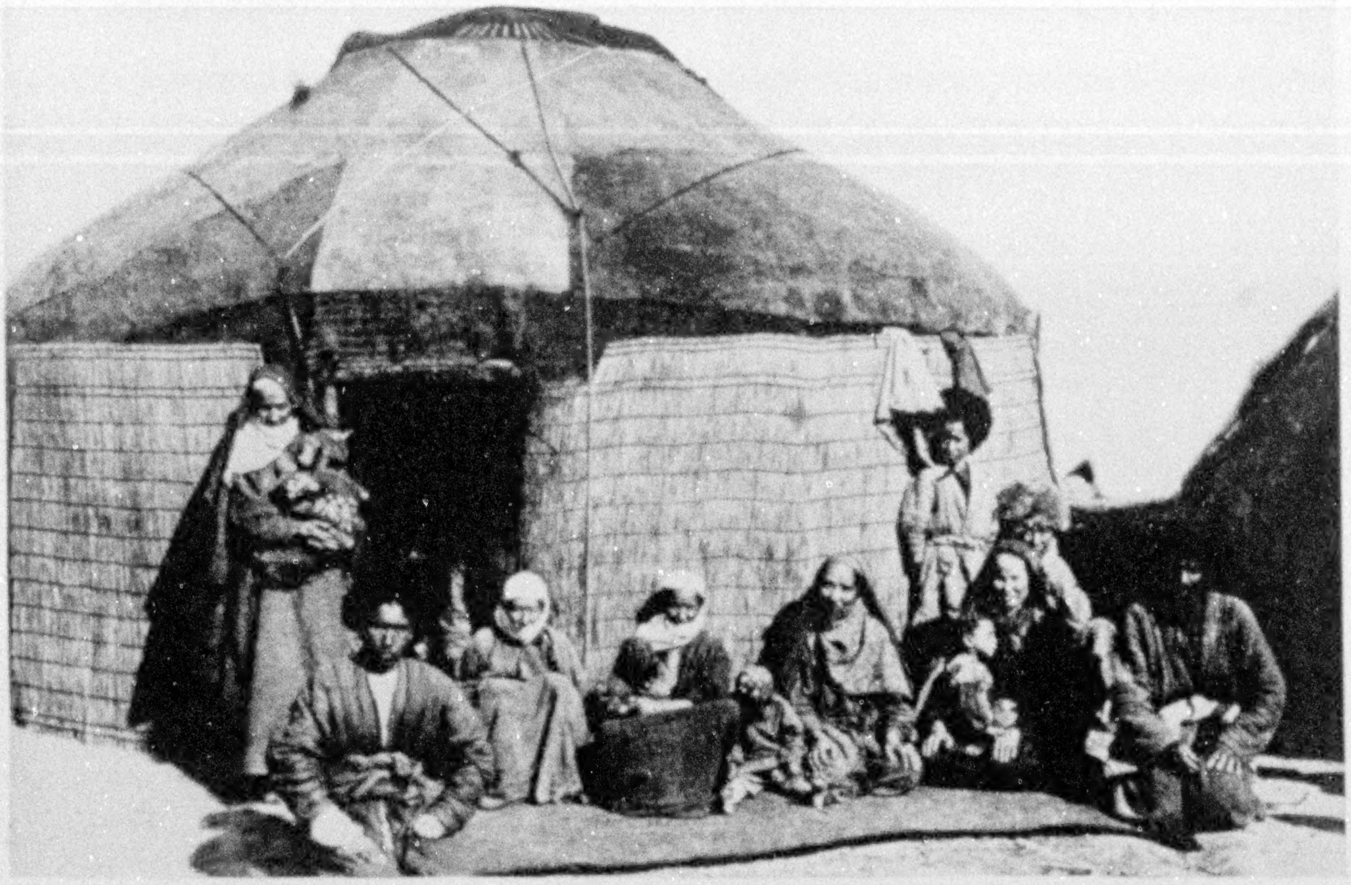
The turban of the Afghan serves many purposes; for, in addition to covering the head, one end is allowed to hang down on the shoulder and is used in turn as a pocket handkerchief, a purse, and a dust veil. The turban is worn over a *kullah* (cap).



Photograph by Haji Mirza Hussein

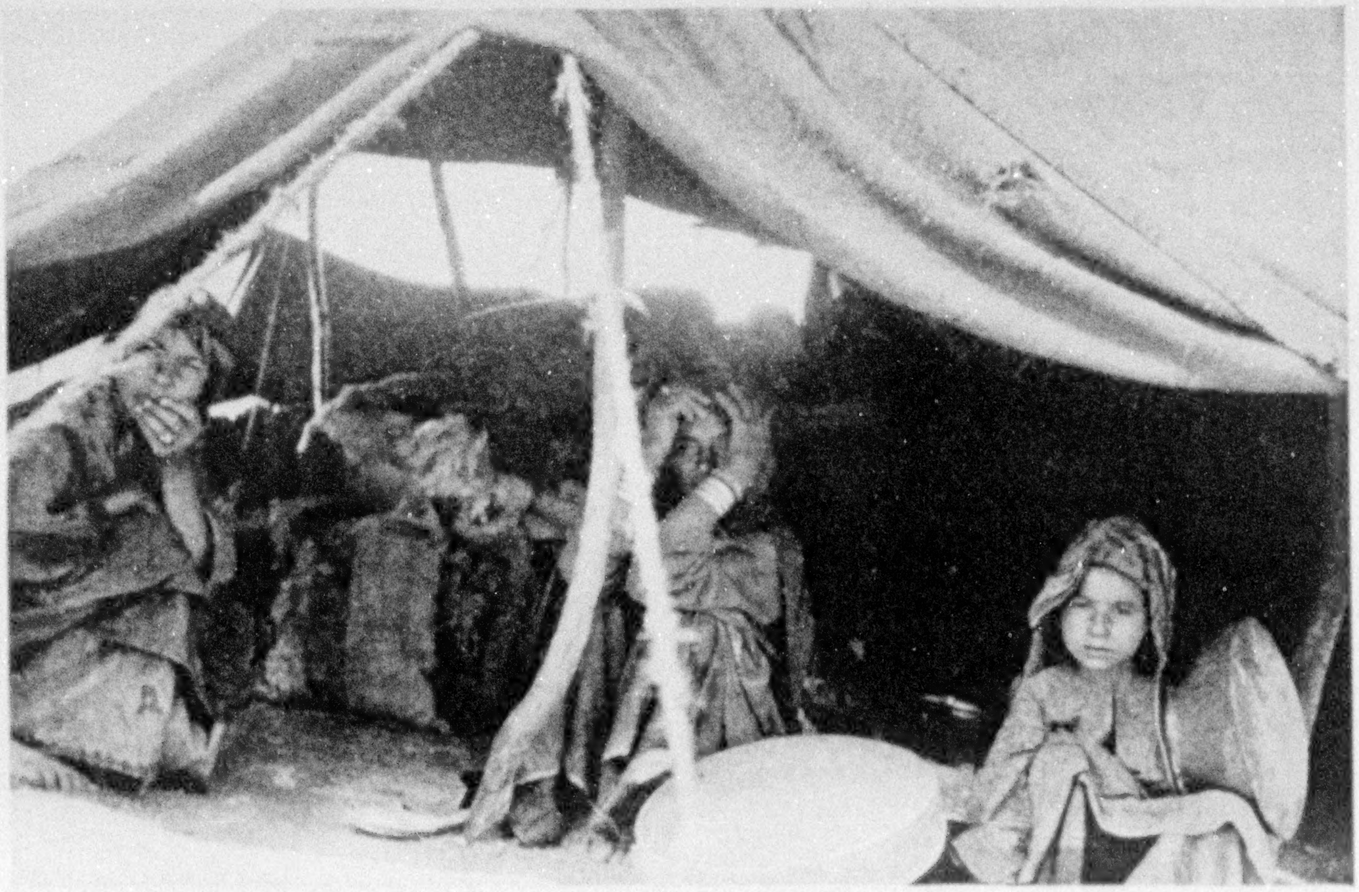
AN AFGHAN MERCHANT OF KABUL

Note the white ivory ring worn on the big toe. The fancy beaded slippers are worn without socks. The average man of the middle class in Afghanistan wears tombons, or pajamas, gathered in at the waist and falling in folds from hips to ankles.



THE MAT AND SKIN HUTS OF AFGHAN TURKESTAN ARE TIED DOWN WITH GUY-ROPES, LIKE TENTS

Huts are divided into small rooms by curtains, and several families are often found in one hut. The floors are covered with felt.



Photographs by Haji Mirza Hussein

AN AFGHAN SHEEP HERDER'S TENT

Little girls help with the sheep, goats, and camels. The heaviest work, around the wells, is done by the men; water is drawn by camel-power, the animals walking away from a well, lifting the water by means of a rope drawn over a wheel. Thus, the length of the beaten path leading out from the well shows its depth to water.

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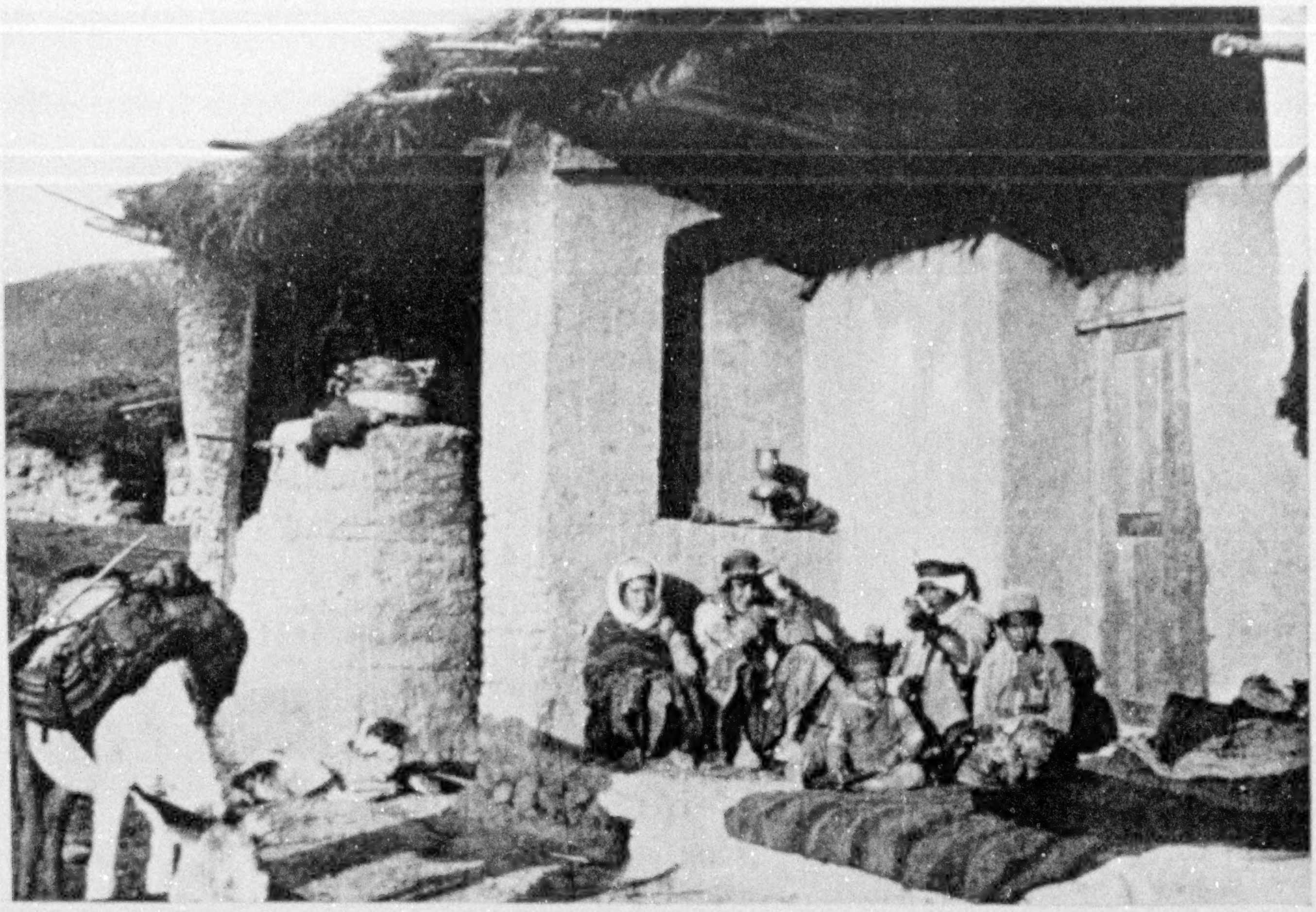
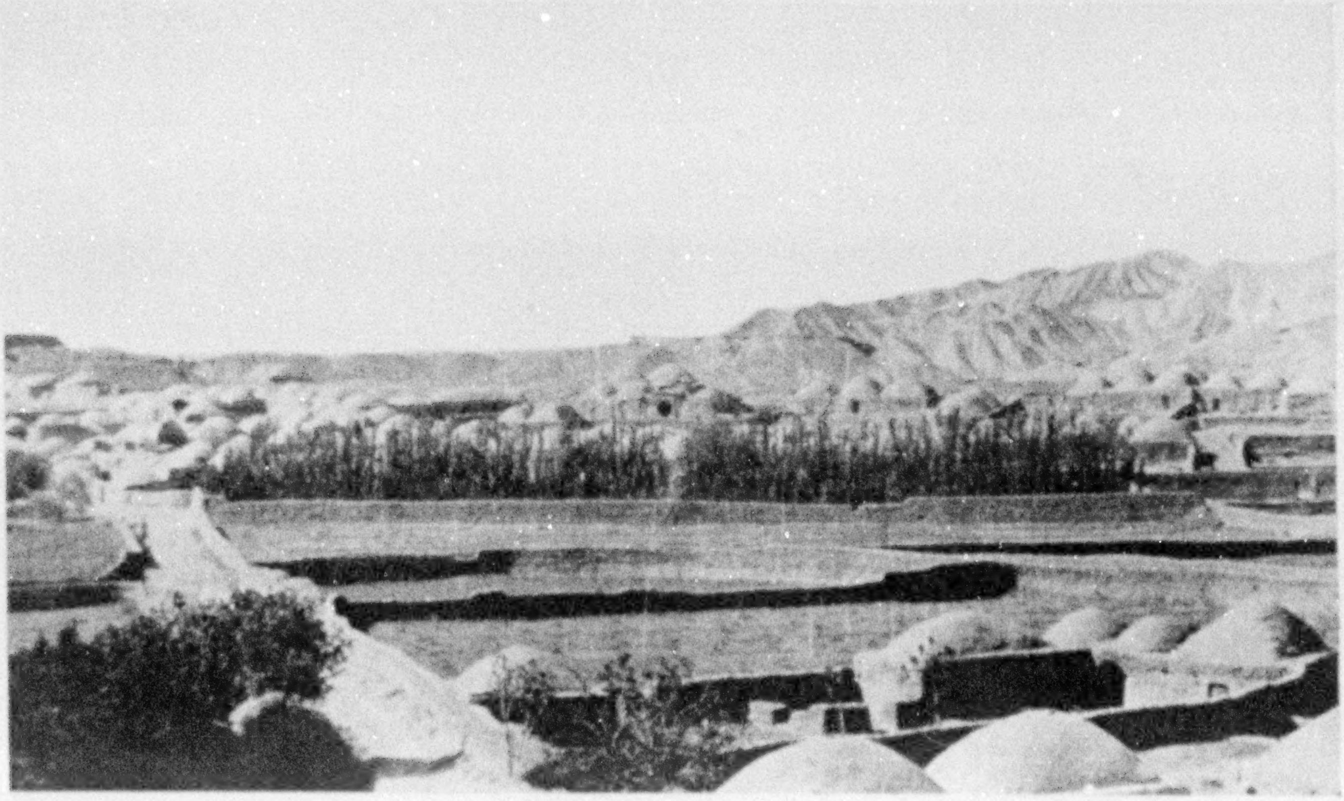


MOST OF THE HOUSES OF AFGHANISTAN ARE CONSTRUCTED OF SUN-BAKED MUD BRICKS

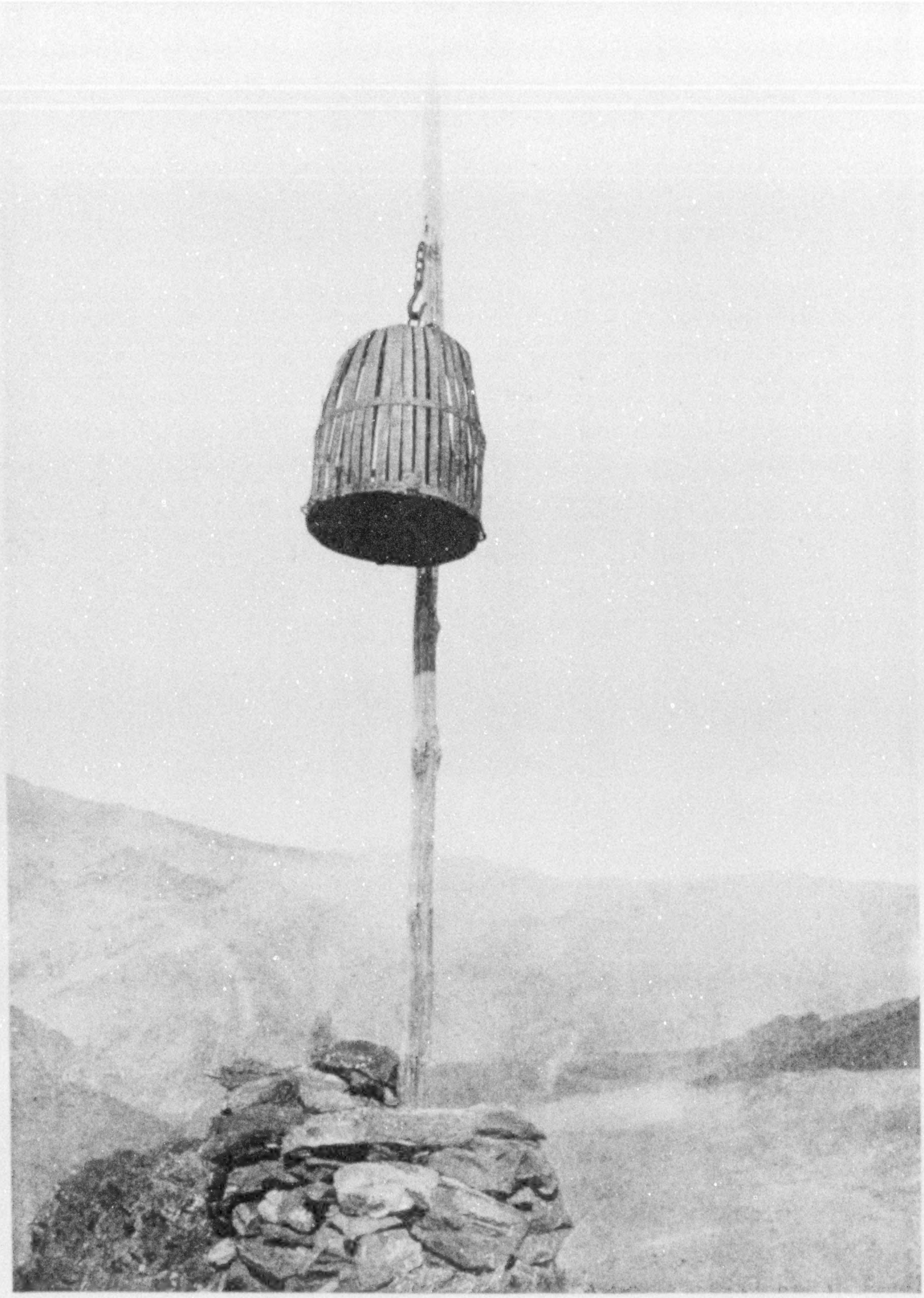
The roofs are made by spreading long rush mats over poles placed as rafters. Upon the mats is smoothly laid about six inches of mud. Bits of hollowed wood are set in the mud to serve as rain-spouts.



Photographs by Haji Mirza Hussein

MANY HOUSES OF AFGHANISTAN RESEMBLE BEEHIVES

To secure strength against the weight of the winter's snow and to shed water, the roofs of these structures are dome-shaped. Although the climate is healthy, due to the hot, dry air, in which bacilli do not thrive, the country is often visited by epidemics, owing to the unclean and insanitary dwellings of the natives.



Photograph by P. O. Crawford

AN IRON MAN-CAGE NEAR THE SUMMIT OF LATABUND PASS, AFGHANISTAN

This pass has always been infested with thieves, and during the reign of Abdur Rahman one of the felons was caught, put in this iron cage, raised to the top of the pole, so that his friends could not pass food or poison to him, and here he was left to die (see pp. 105 and 106).

lege to exploit the poor, and the burden of taxation is very heavy.

As for entertainment, the people, especially the wealthy, are fond of games and of sports. Hunting, horse-racing, wrestling matches, and gymnastic games are popular. Recently, football and tennis have been adopted by the upper-class youngsters of Kabul. Ram fights, cockfighting, and even fights between male quail are favorite diversions, and throughout all Afghanistan dancing is indulged in and the public declamation of ballads is warmly applauded.

ODD COMBINATIONS IN EUROPEAN COSTUMES

Every better-class Afghan owns a piano, imported from Bombay, which he plays with one finger, keeping his foot on the loud pedal constantly. When Haji Mirza Hussein played for them, using ten fingers at a time, they were overcome with amazement and admiration. A tale is told of one man at Kabul who sawed the legs off his grand piano, so that he might play it while sitting on the floor, Afghan fashion.

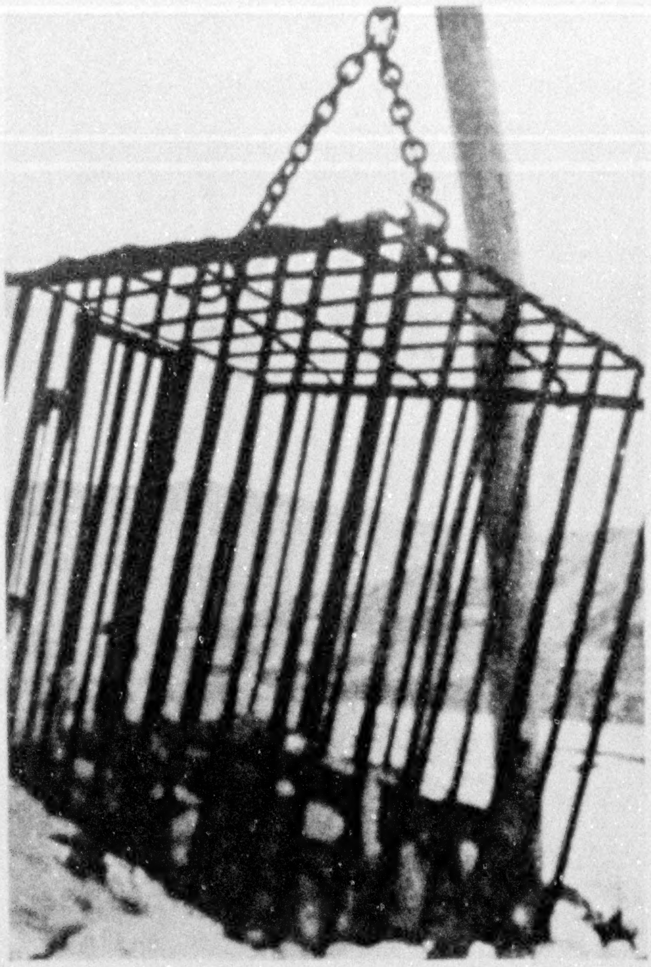
Costumes vary in different parts of the country. In the East the garments approach the Indian style, and of late years a few natives have even appeared in European dress. Lately, the Amir has introduced European uniforms and suits for himself and his whole staff of officials.

European hats and uniforms of all styles, imported in quantities from India, are often worn in the most singular combinations. One servant in Herat was seen wearing a tile hat, even when sitting in the house. It was held in place with an elastic band, which was passed under his chin. His body was wrapped in an old blue coat with brass buttons, which had strayed from the wardrobe of a railroad conductor in Germany. He had on baggy Afghan pants, with his bare feet sticking out from under the big blue coat.

THREE KINDS OF HEADGEAR ARE WORN

Often the Amir is accompanied by a sort of court jester, who wears a gray tile hat of extra height (like the Boers formerly wore), and colored tights. Instead of the harlequin's sword, he carries a fly-swatter!

The typical national dress of the Afghan consists of a longtailed calico shirt, white pants, leather shoes or boots, and a tanned sheepskin coat elaborately embroidered with yellow silk; this coat is sometimes replaced by a long toga of red cloth.

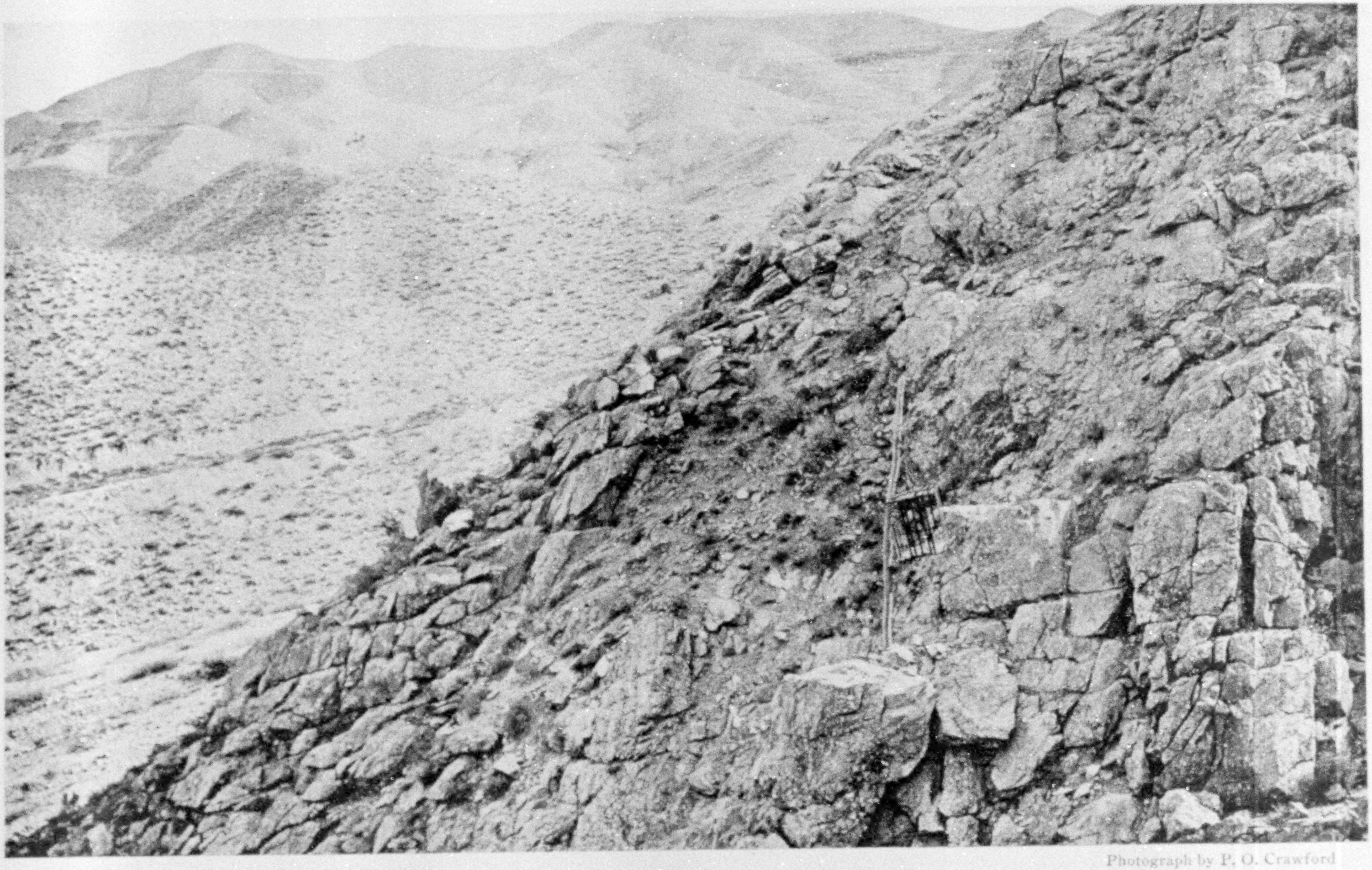


Photograph by Haji Mirza Hussein

THE "RUBBISH" IN THE BOTTOM OF THIS MAN-CAGE WAS ONCE A SUBJECT OF THE AMIR

Three kinds of headgear are customary. Some wear a low, many-colored cap; others a blue or white turban, which is frequently gold-embroidered with a flap hanging down behind to protect the neck from the sun. In some provinces men wear the *kullah*, a colored cap that looks like a Turkish fez, but which widens toward the top.

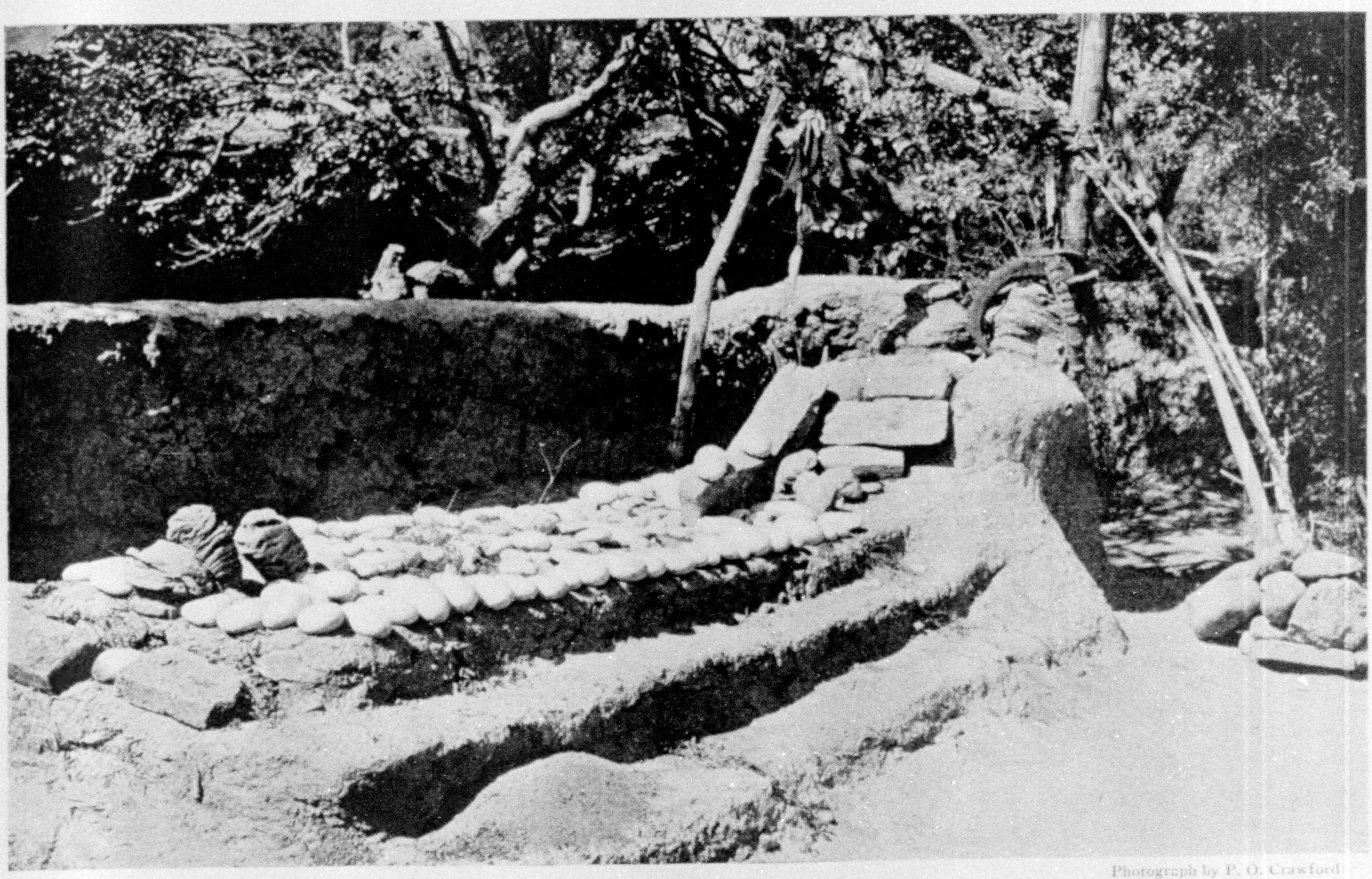
In the house and at work women wear long calico shirts, wide, colored pants like the men and head-cloths above gold-embroidered caps. Their street dress consists of long, wide pants and a blue or black overdress, the costume being completed by a loose garment that covers the head and upper part of the body, just allowing the eyes to look through a latticed insert like a strip of mosquito bar. The feet are stuck in large red slippers.



Photograph by P. O. Crawford

AN EXECUTION-POST AMONG THE BARREN MOUNTAINS OF AFGHANISTAN

Such atrocious forms of punishment as shooting a prisoner from a cannon's muzzle, stoning him to death, burying him alive, and cutting off his hands and feet or putting out his eyes are seldom employed nowadays in Afghanistan, but the iron man-cage is still a favorite method of making the wicked cease from troubling (see pages 104 and 105).



Photograph by P. O. Crawford

THE RAM'S HORNS AT THE HEAD OF THE GRAVE INDICATE THAT THIS IS THE BURIAL PLACE OF A HOLY MAN OF AFGHANISTAN

Instances are reported where pious men have been deliberately assassinated by certain tribes and then buried in the tribal village, in order that the community might wax affluent on the toll collected from pilgrims coming to visit the shrine.

Photograph by Haji Mirza Hussein

AMANULLAH KHAN, THE AMIR OF AFGHANISTAN

His word is absolute law to his people. He alone has the power to pronounce death sentences. He runs his country's trade, religion, and politics and censors its only newspaper.

The bill of fare of the Afghan is very simple and reflects the poverty of the country. Bread, fruits, vegetables, tea, sweet milk, sour milk, and cheese are the main foods. Rice, mutton, fowl, and sweets cooked in various ways are found on the tables of the well-to-do. The average Afghan has no particular fondness for wine or spirits.

Tobacco raised in the land is of inferior quality; the better sorts are imported from Persia, Russia, India, and Egypt. The Amir Habibullah Khan always had a good private stock of Havana cigars. Both young and old people take snuff.

Tea, sweetened and unsweetened, is the favorite drink and is consumed in prodigious quantities. When you go to see an Afghan, you can hardly escape before swallowing four or five cups of tea; it is, therefore, no trifling gastronomic feat to pay several visits in one afternoon, the more so if the polite host (with a view of honoring the European guests) has the tea served in big Russian glasses.

The right hand is always used in eating and drinking, the left hand being considered unclean.

Dogs, though numerous and useful, are looked upon as unclean, and pious people never touch them.

THE AFGHAN WILL NOT KILL FLEAS

Animals that go badly lame on the march or camels that get snow-bound in the mountain passes are abandoned to their fate. Afghans never kill such animals, as we might do, to put them out of their misery. They believe that the lives of all living things are in the hands of Allah, and that man sins if he presumes to interfere with the Supreme Will. Afghans will not even kill fleas or other vermin; they merely pick them off and throw them away!

The trade of Afghanistan is moved entirely by caravans and is largely in the hands of Hindus and Tadjiks. The chief route lies through the famous Khyber Pass, the great gateway from India, which has been fortified by the British Government (see pages 92-94).

This pass is open every week, on Tuesdays and Fridays, except in very hot weather, when it is available to trade only on Fridays. A most rigid scrutiny is exercised by the Amir's agents on all who come and go. As soon as caravans from India enter the country, their Indian leaders are turned back and heavily armed Afghan guides take their places.

Some of these Afghan caravans, organized with military precision, number thousands of camels and a proportionate number of guides and camel-drivers. In the morning the Khyber Pass is open for caravans coming into Afghanistan, and

XUM

in the afternoon for those routed in the opposite direction. The pass is absolutely closed between sundown and sun-up.

Camels leaving the country are usually loaded with wool, skins, dried fruits and vegetables, assorted gums, and spices. Thousands of horses are also driven along for sale in India as cavalry and polo mounts.

THE AMIR STUDIES MAIL-ORDER CATALOGUES

Supplying the wants of the Amir and his court is an interesting undertaking and is usually accomplished by his own agents, who reside in the cities of India. All goods consigned to him come in duty free; he buys anything that strikes his fancy, and often amuses himself by studying the pictures in mail-order catalogues.

In his various palaces and government offices the Amir has installed a few American desks, typewriters, sewing-machines, and clocks.

The Yankee fountain pen and cheap watch are popular in Kabul. Most imports, however, come from India and China. Of late much Japanese merchandise is finding its way into the country. Either directly or through reshipping, India supplies Afghanistan with cotton goods, hardware, sugar and tea, dye materials, and silver bars for the coining of money.

Gun running and the smuggling of ammunition, which flourished for many years, have recently been restricted by British supervision of the Indian frontiers.

Though camels and pack-horses (yabus) are mostly used for transport, it is not at all uncommon to see elephants and even wheelbarrows, on the Afghan trails.

The main road between Kabul and Peshawar has been improved by the Amir, and a few American trucks belonging to him are used on this stretch of road for hauling freight. These trucks are operated by Hindu chauffeurs.

Along all the caravan trails in the country are good, solid caravansaries, built of stone and clay, situated about a day's march from each other.

The most important caravan roads leading out of Afghanistan are: In the west, from Herat to Meshed; in the north, from Maimene and Aktcha to Kerki; in the east, from Kabul to Peshawar and in the south from Kandahar to Quetta.

Important cities like Kabul, Kandahar, Herat, Maimene, and Mazar-i-Sharif are connected by fairly good caravan roads, which, over various long stretches, can be used by motor cars. The Amir has good motor roads built in and around Kabul to link up his palaces.

Owing to the aggressive pursuit and harsh punishment meted out by the Amir's troops, the once famous robbers of the Afghan hills have almost disappeared, so that caravans, even in the desert districts, can now travel in safety; but in some provinces near the borders constant quarrels and raids are going on among hostile tribes.

AFRAID OF RAILROADS AND TELEGRAPHS

Afghanistan maintains a postal service with horsemen and couriers on foot, but it is not yet linked up with the International Postal Union. For fear of opening his empire to foreigners, the Amir has so far objected to the building of railroads and telegraphs.

Much remains to be done in the direction of developing the trades and arts. Like the Persians, the Afghans have abandoned many good old national home industries and now buy mostly cheap European goods. Apart from a few xylographs, some crude adornments for women, a little silk and felt, and a few simple woven tissues, no products of native skilled labor are on the market. And even much of what is produced in these few lines is merely an imitation of Western and Eastern art. Small industries supply only the most urgent needs of the lower classes. The rich people buy their luxuries from abroad, and the poor make shabby shift with the cheaper fabrics.

In Kandahar a small colony of native artists supports itself by carving prayer beads, many of which are sent by the pilgrims for sale in Mecca.

In military matters Turkish influence is noticeable, and Turkish officers are used as instructors. In all Asia no fighting force is more picturesque or presents

XUM

a more astonishing mixture of ancient and modern fighting methods than does the army of the Amir. Most of his troops are mounted, either on horses or camels, and a few of his better regiments of cavalry are organized somewhat after the Anglo-Indian style. The regulars are recruited mostly from among the town-dwelling Tadjiks.

The Malkis, or territorials, are organized and used in the various provinces as a sort of home guard. Some of them use flintlocks, and many depend on the spear and the long, curved sword for dispatching an enemy at close quarters.

This army is about 70,000 strong. Save a few field howitzers and mountain guns it has no artillery.

The real Afghans belong to the Sunni sect of Moslems. Here, as elsewhere in Moslem countries, the Sunnis have no close relations with the Shia Persians or with the Hazarah Shiite tribe in the high central region. Nor do the Afghans feel at all kindly toward the non-Mohammedan Indians who venture in for barter and trade. The Turks, however, being Sunnis, are popular with the Afghans.

Every year companies of pious Afghans make the pilgrimage to Mecca.

Shia Hazarahs, as well as some of the Sunni Afghans, journey to the sanctuary of Iman Rizas at Meshed, in northeast Persia, to say their prayers, and some few even venture on the long and perilous journey across Persia, to the shrines of Kerbela and Nedjef, in Mesopotamia; also, since the days of the Zoroastrians, a tomb at Mazar-i-Sharif, in northern Afghanistan, has been a shrine that has drawn pilgrims from all over the country.

Smaller shrines and sacred tombs are found in various villages throughout Afghanistan. The rumor is current that aged persons of great piety have been deliberately assassinated by certain tribes and then buried in the tribal villages, in order that steady profits might be reaped from pilgrims coming later to pray at the good men's tombs.

Afghanistan's willful isolation of herself has, of course, affected the life of her people. Even among the different tribes within the country, jealousies and ethnological differences are conspicuous. The high mountains and frequent deserts so separate the cultivated and inhabited districts that tribal customs and habits, tongues, and religious differences are found here in sharper contrast than in most other countries of the East.

As a race, the Afghans are more observant of the Koran's prohibition law than some of their fellow-Moslems farther west. Only now and then, when a caravan comes up from India, the less orthodox element in Kabul enjoys a brief period of alcoholic relaxation.

The Amir keeps at Peshawar a political agent, who occasionally pays a visit to the Viceroy of India; and, since Afghanistan's formal independence of 1919, envoys have been sent to Persia and one is perhaps now in Soviet Russia.

But because of the Afghan's chronic aversion to all foreigners, and the clever exclusion policy of the Amir, aided by nature's own barriers of sand wastes and almost inaccessible mountain ranges, it is likely that for a long time to come foreign influence will spread but slowly in this isolated land.

AFGHANS FOLLOW WORLD EVENTS

Yet the Amir and his military aristocracy follow intently all big events in the turbulent outside world. America is spoken of with sympathy and admiration, and, despite the prevailing illiteracy, many Afghans display an amazing knowledge of geography and current history. During the World War even the nomads on the steppes had fairly accurate news of great battles, and they had heard of air raids and submarines.

Today all Islam is in ominous ferment. Though the World War is officially ended, fights and disputes are still sweeping over Asia. Eventually and inevitably Afghanistan must again become the object of rivalry among big powers that rub shoulders in the East.

Anticipating many requests from members for copies, suitable for framing, of the frontispiece to this number of THE GEOGRAPHIC, *"The Argosy of Geography," a limited de luxe edition has been printed on heavy art mat paper, postpaid in the United States, $1.00. The February* GEOGRAPHIC *will contain as a supplement, a map of the New Europe, in colors, size 30 x 32 inches.*

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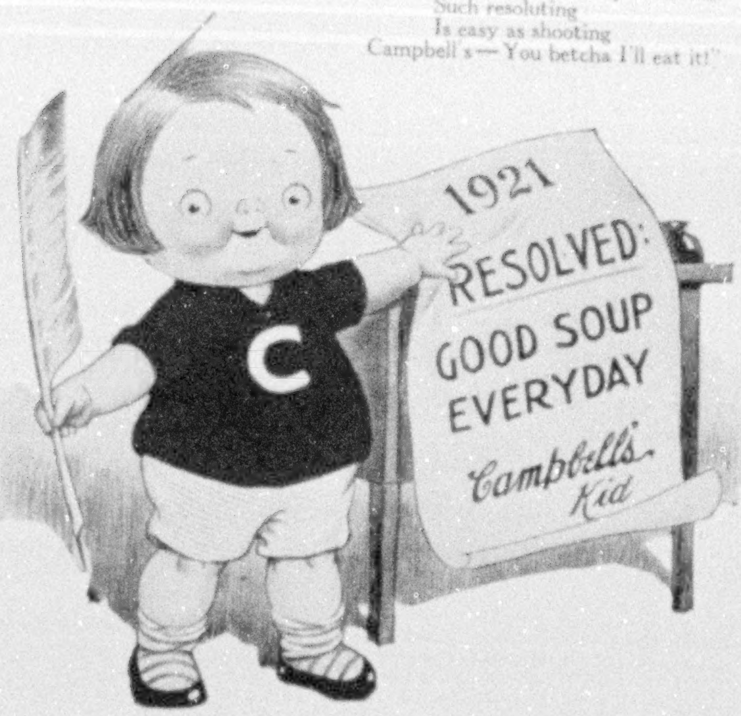
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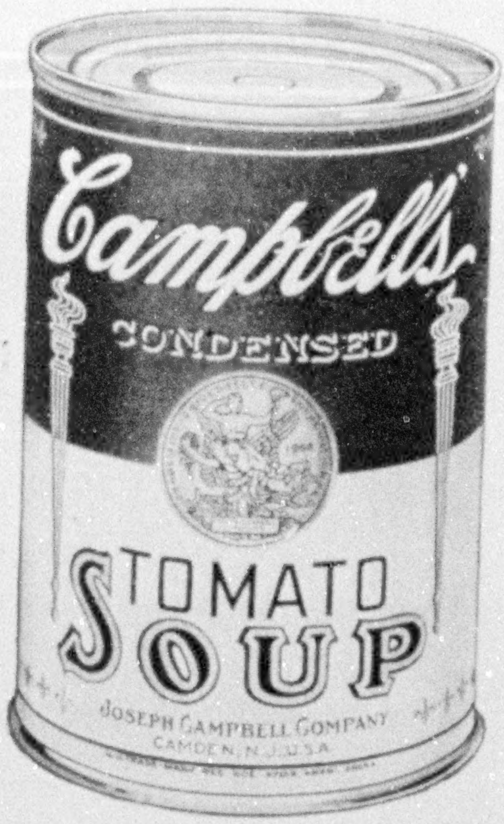
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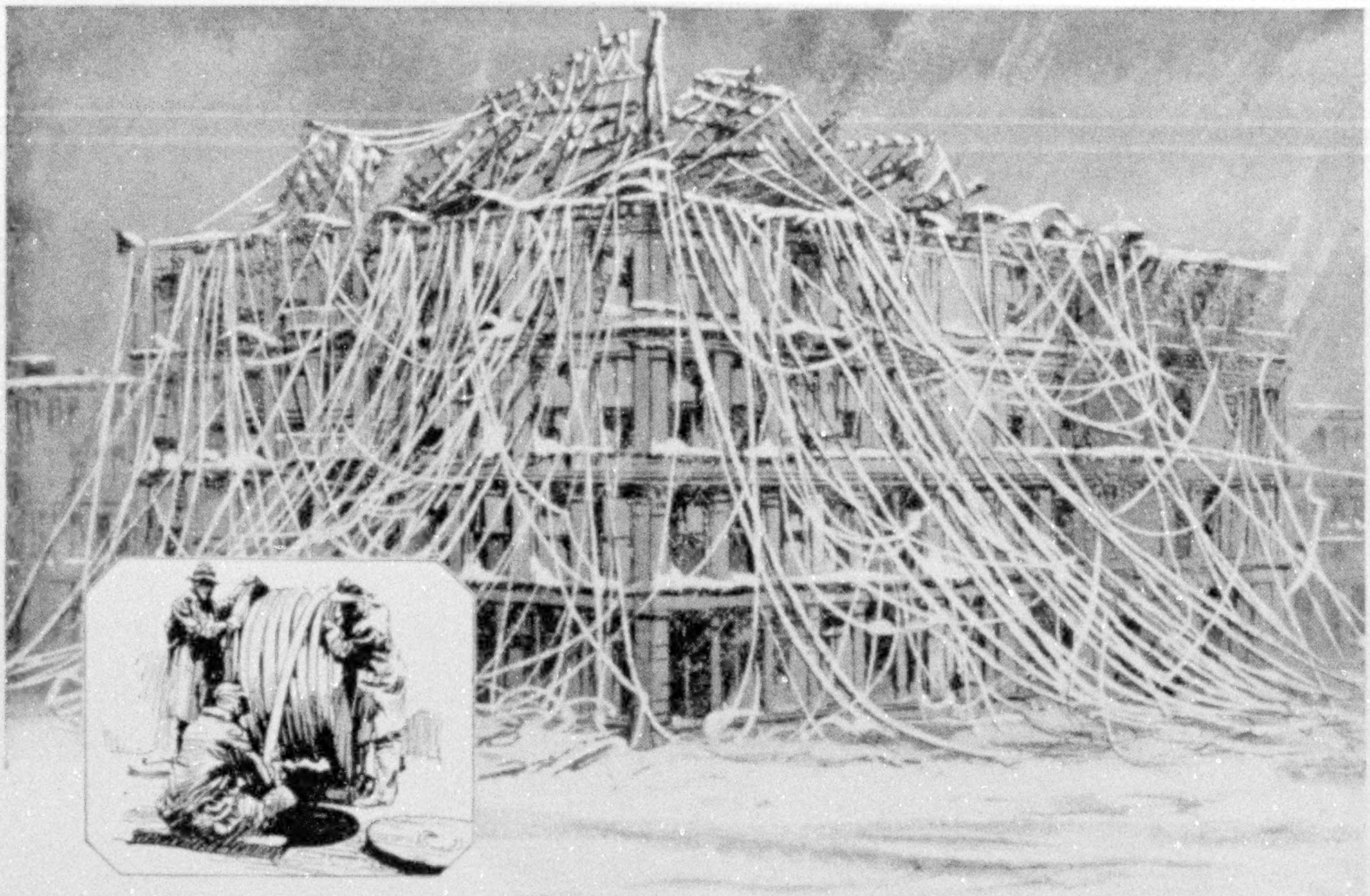

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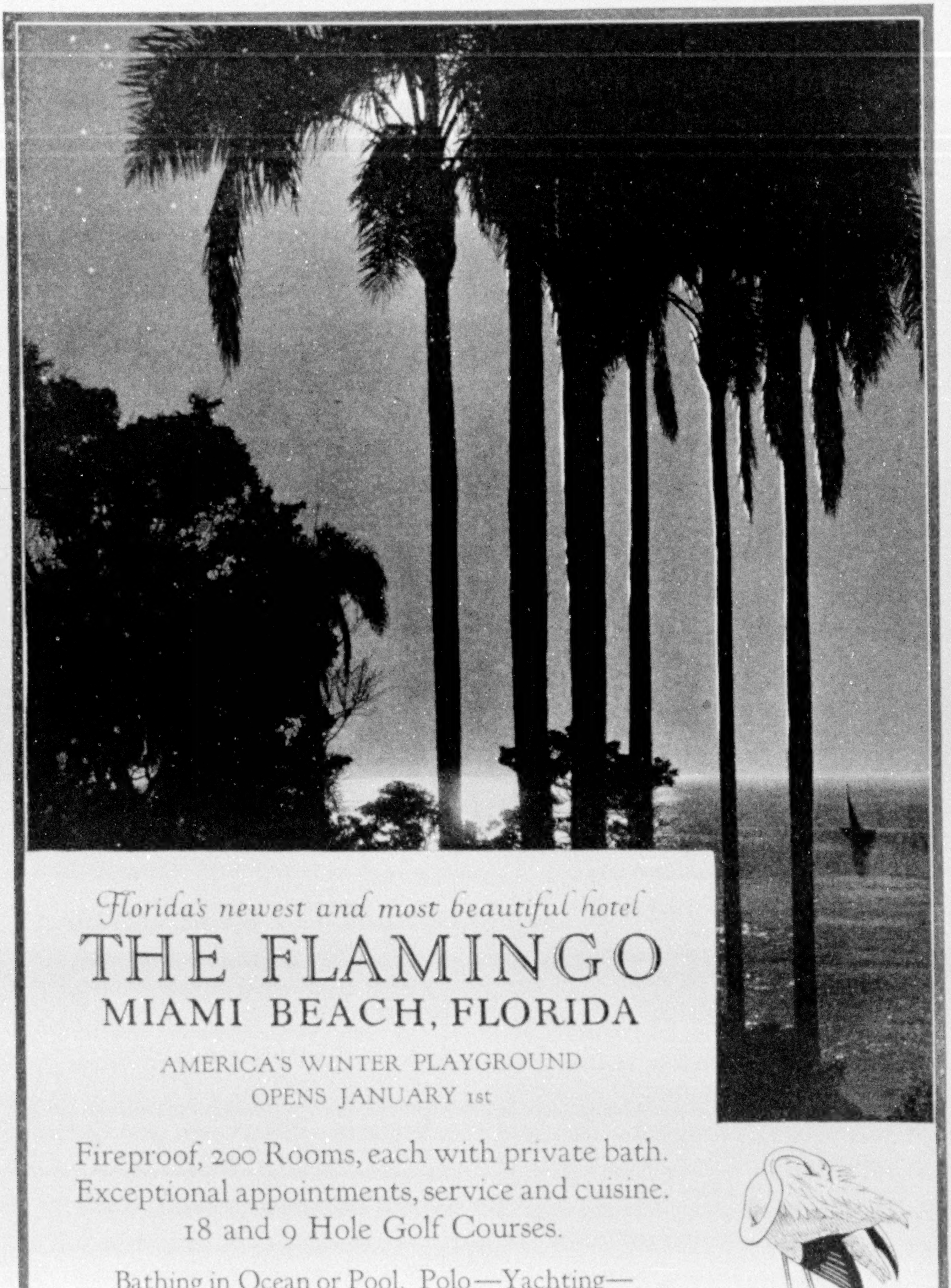

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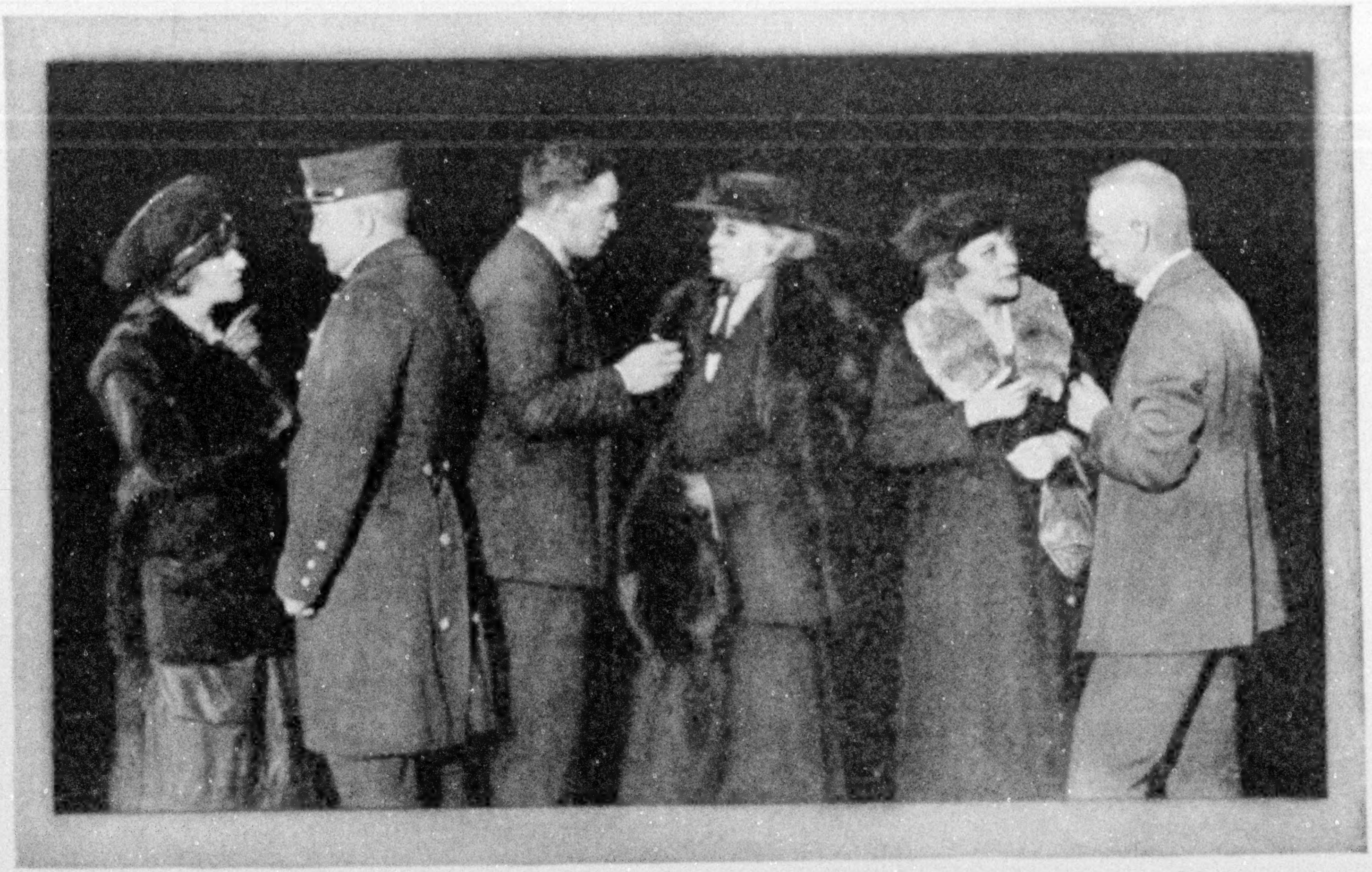

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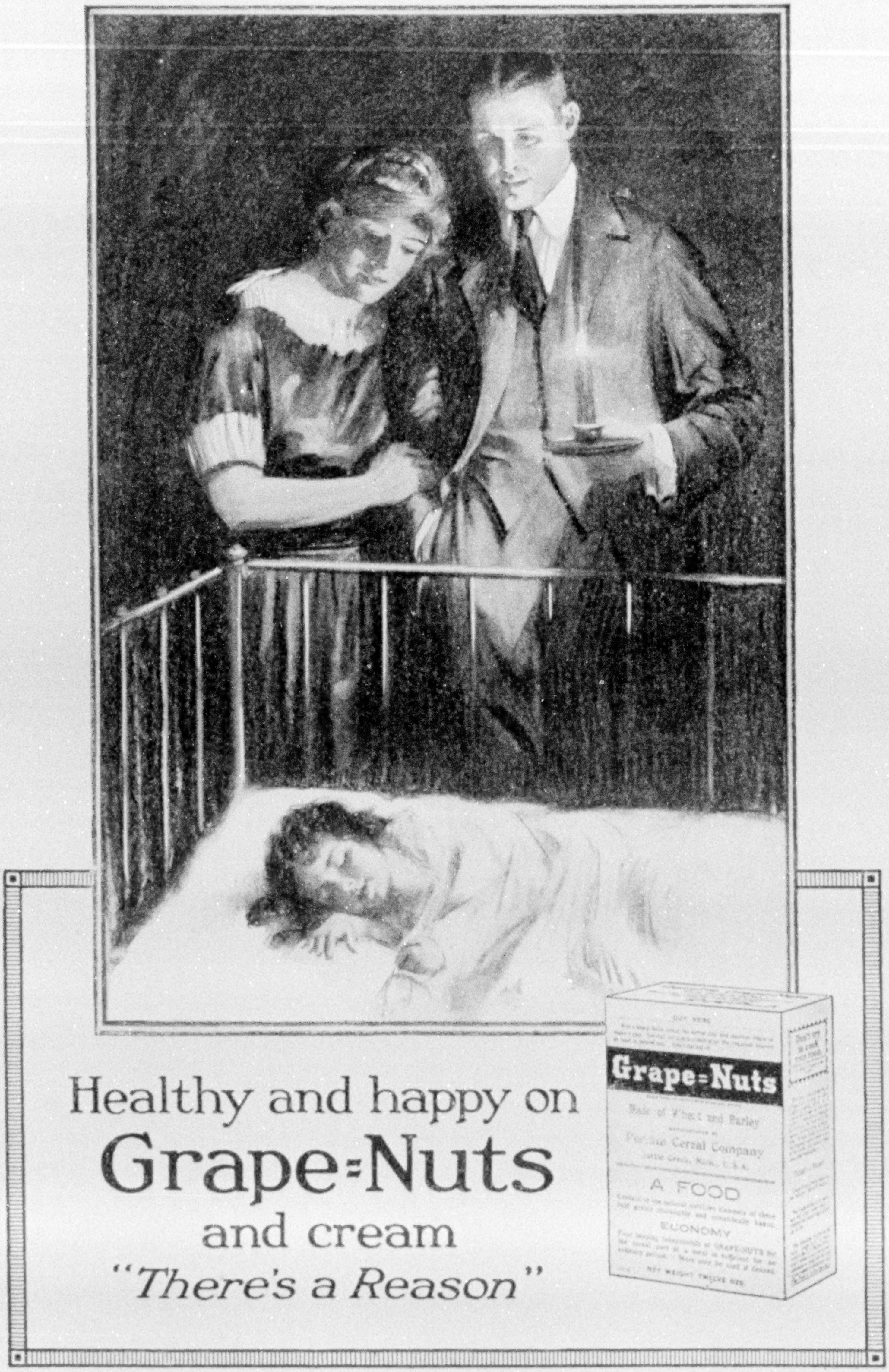

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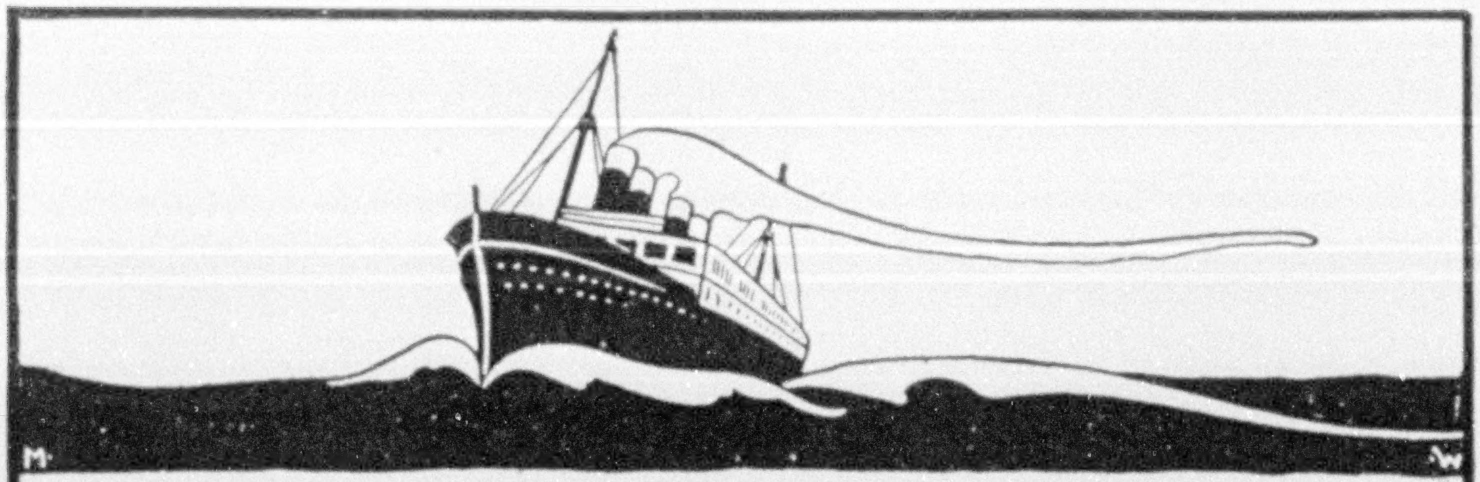

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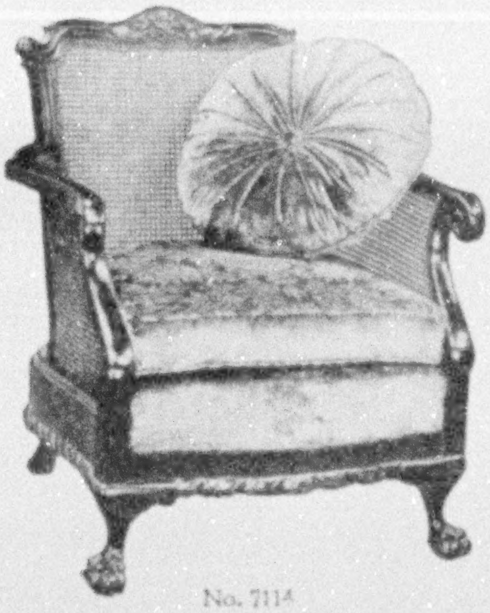

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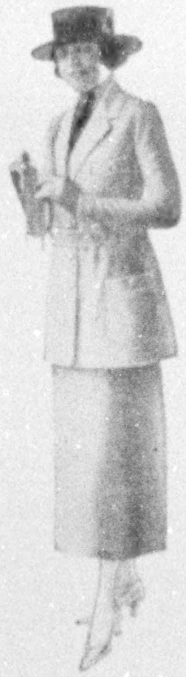

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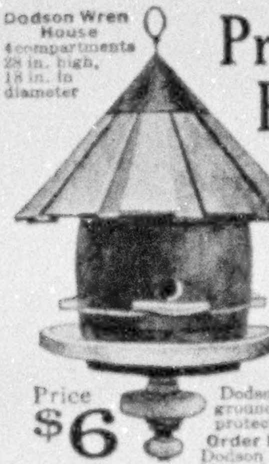

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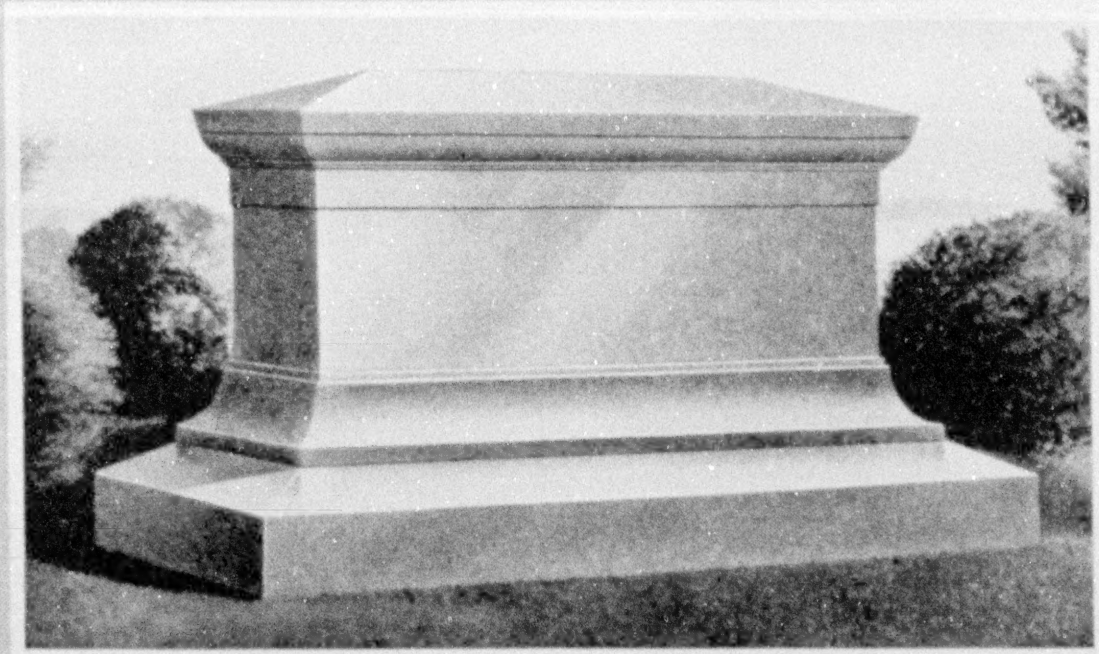

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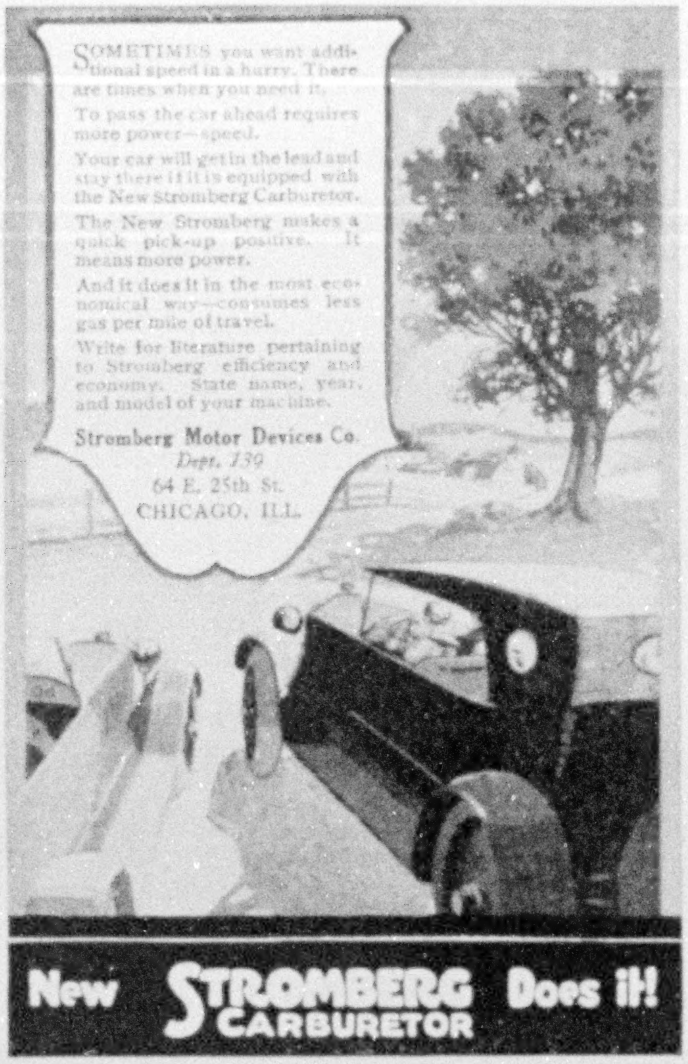

SOMETIMES you want additional speed in a hurry. There are times when you need it.

To pass the car ahead requires more power—speed.

Your car will get in the lead and stay there if it is equipped with the New Stromberg Carburetor.

The New Stromberg makes a quick pick-up positive. It means more power.

And it does it in the most economical way—consumes less gas per mile of travel.

Write for literature pertaining to Stromberg efficiency and economy. State name, year, and model of your machine.

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64 E. 25th St.
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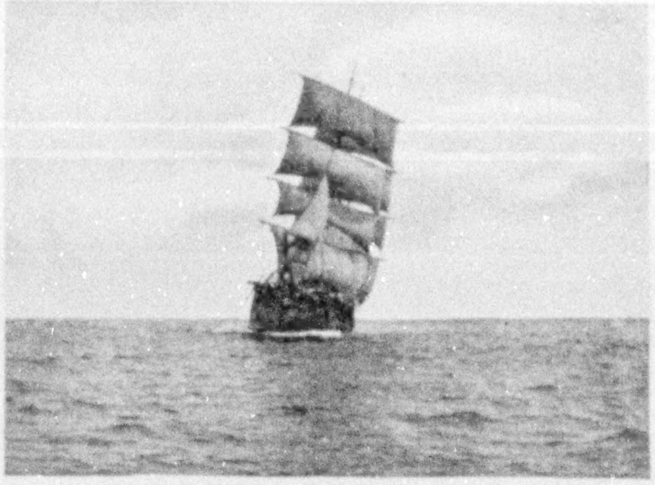

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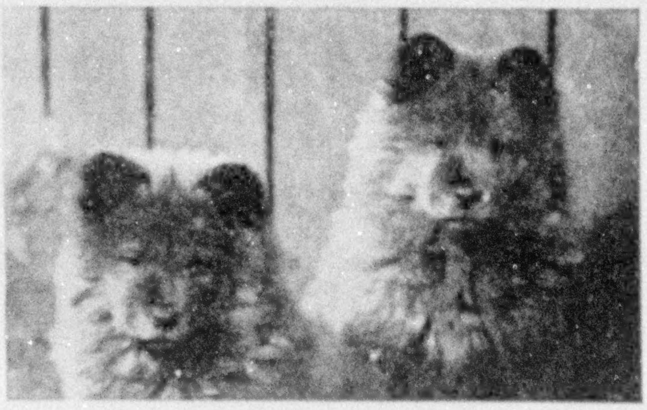

The Book of Dogs

The character, heroism, and sagacity of mankind's best friend

This book, with its 100 full-color dog portraits by Louis Agassiz Fuertes, its authoritative descriptions of breeds and canine character, is a guide to dog-fancier and a delight to all who love dogs.

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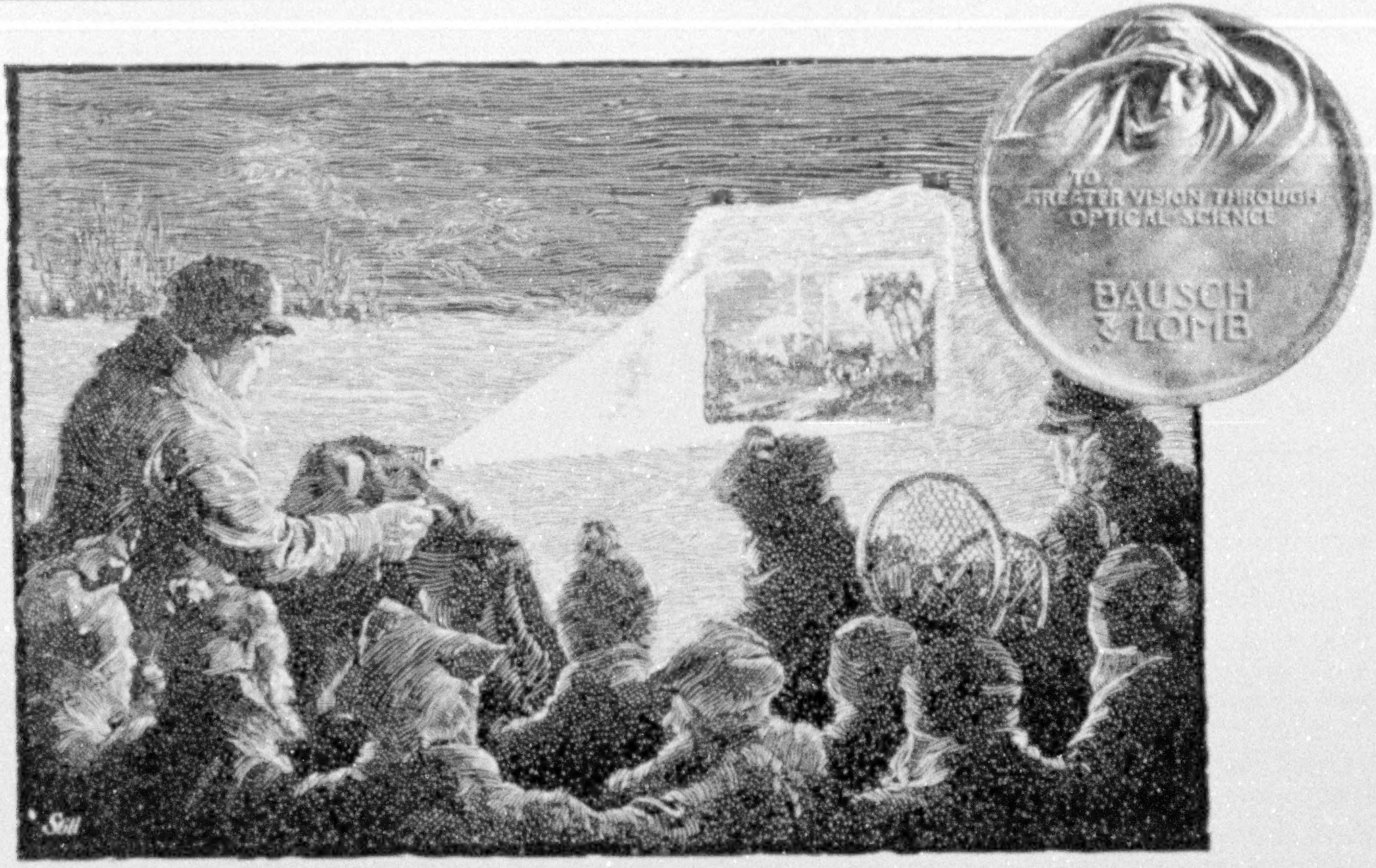

Opening the Shortest Pathway to the Brain

IT is the prolonged dusk of Arctic night one hundred miles above the Circle—the thermometer far below zero and snow piled mountains high. A crowd of unlearned but eager Lapps, too numerous for the small mission chapel nearby, are assembled in the open air on skis and snowshoes—their eyes centered on a crudely erected screen of snow.

Across this screen, as white as Nature can make it, flashes a succession of vivid pictures—Japan, China, Korea, tropical India, all imaged on that Arctic background—pictures of climes and peoples that benighted audience had never dreamed of. And the source? A simple but efficient little stereopticon, the Balopticon, mounted on a rough table in the snow and covered with a heavy, protecting blanket, that its lenses may not break in the frigid atmosphere.

This true incident is perhaps unusual, but no more significant than countless other instances of Balopticon service. Optical projection has broken down the travel barriers to a knowledge of the earth. Photography and projection co-operating bring the world to our feet, for whatever can be photographed anywhere can be projected in life-like reproductions anywhere else.

And so in church and mission, school and college, lecture hall and home, wherever people of any race or creed gather together, the Balopticon has made its enlightening way, adding to the sum total of human knowledge as no other agency can. For the eye is the gateway of the shortest nerve path to the brain. What the eye sees, the brain comprehends quickest and remembers longest.

In its development of the Balopticon to represent the most complete and efficient line of projection apparatus obtainable, the Bausch & Lomb Optical Company has but further enriched its seventy years of service—of supplying practically every form of lens or optical instrument that humanity needs in its search for truth and knowledge.

Write for Special Balopticon Circular or Literature on Other Lines.

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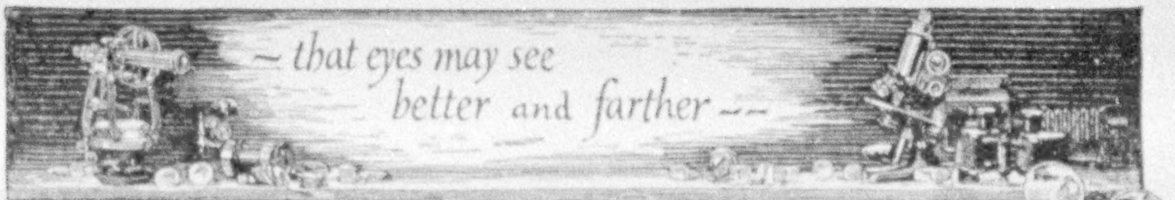
Makers of Eyeglass and Spectacle Lenses, Photographic Lenses, Microscopes, Balopticons, Binoculars and other Optical Instruments.



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The Great American Heart

A prominent woman going thru one of our great steel mills remarked, "Human hearts made all this; human hearts make it go." Behind *all* American energy, mental and physical, is the steady pumping of the great American Heart, achieving American progress and success.

Americans give too little thought to their human engine—overwork it—neglect it. The cheapest automobile gets more attention. No wonder 10,682 deaths during 1919 in New York City alone were due to heart disorders.

Play fair with your heart. Add happy energetic years to your life.

In this connection

THE GLEN SPRINGS

WATKINS GLEN, N. Y., ON SENECA LAKE

WILLIAM E. LEFFINGWELL, President

The Pioneer American "Cure" for Heart Disorders

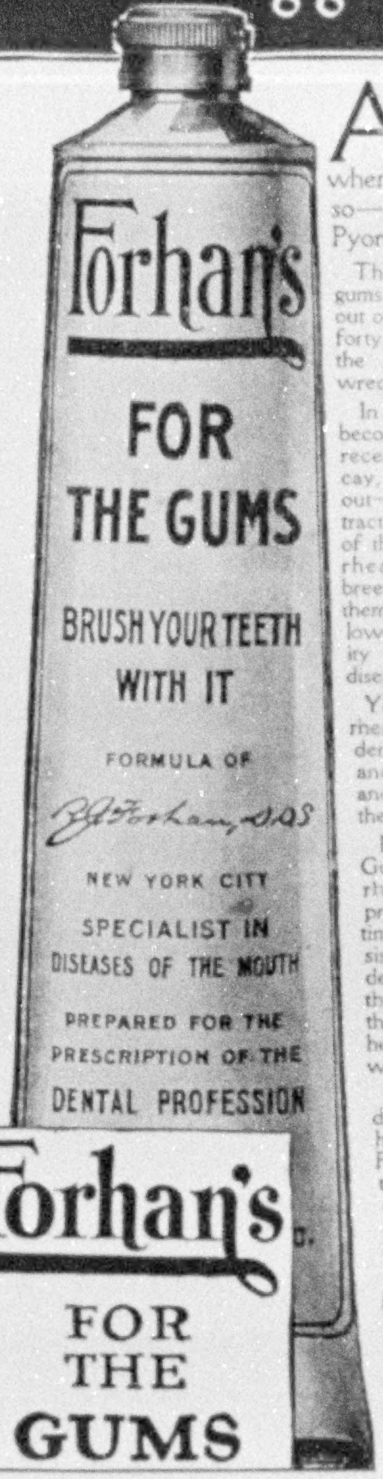
Its mission is to give intelligent rest—make fit and keep fit your human machine—and especially its engine, the American heart.

The medical world recognizes this ability of Glen Springs. Its Nauheim Baths, chemical and X-Ray laboratories and scientific treatments, under the direction of physicians, are particularly adapted to heart disease, circulatory, kidney, nutritional and nervous disorders, rheumatism, gout, and obesity. It is the only place in America where the Nauheim Baths for heart and circulatory disorders are given with a natural, calcium chloride brine.

Situated in the beautiful Finger Lakes Region of New York State. Clear, dry, invigorating atmosphere. Every comfort for you and your family. Open all year, but Winter, with elements of oppressive weather absent, is especially appealing.

Illustrated booklets with detailed information will be sent on request

A dangerous warning—bleeding gums


Forhan's
FOR THE GUMS
BRUSH YOUR TEETH WITH IT
FORMULA OF
R.J. Forhan, D.D.S.
NEW YORK CITY
SPECIALIST IN DISEASES OF THE MOUTH
PREPARED FOR THE PRESCRIPTION OF THE DENTAL PROFESSION

Forhan's

FOR THE GUMS

ARE your gums tender? Do they bleed when brushed? If so—watch out for Pyorrhea.

This disease of the gums, which afflicts four out of five people over forty, not only destroys the teeth, but often wrecks the health.

In Pyorrhea the gums become spongy, then recede; the teeth decay, loosen and fall out—or must be extracted to rid the system of the infecting Pyorrhea germs which breed in pockets about them. These germs lower the body's vitality and cause many diseases.

You can keep Pyorrhea away. Visit your dentist often for tooth and gum inspection, and use Forhan's For the Gums.

Forhan's For the Gums prevents Pyorrhea—or checks its progress—if used in time and used consistently. Ordinary dentifrices cannot do this. Forhan's keeps the gums firm and healthy—the teeth white and clean.

Start using it today. If your gums have receded, use Forhan's according to directions, and consult a dentist immediately for special treatment.

35c and 60c tubes in U.S. and Canada

Formula of
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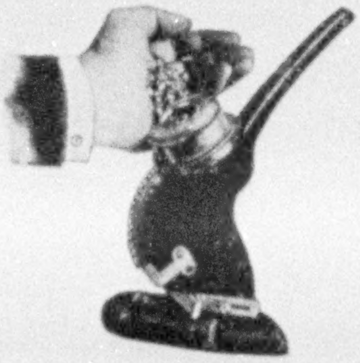
THE AJAX EYELET FASTENER

BINDS PAPERS QUICKLY AND PERMANENTLY

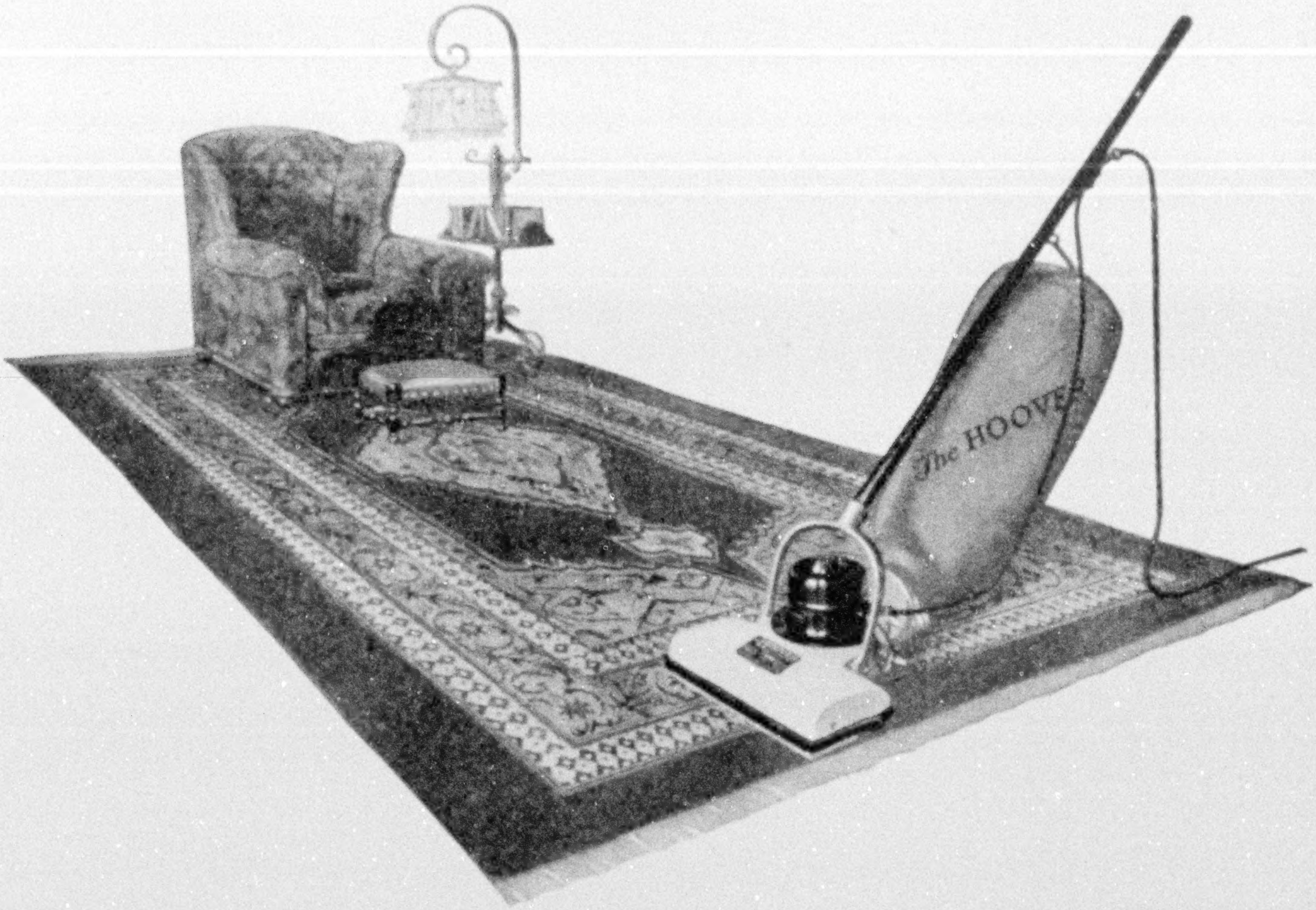


It Saves Time by Punching the Hole, Feeding the Eyelet and Clinching It in One Operation.

Drop the eyelets into the magazine and go right ahead. Order from your stationer or direct.

Write for our catalogue of office tools

MACHINE APPLIANCE CORPORATION
353 Jay Street Brooklyn, N. Y.

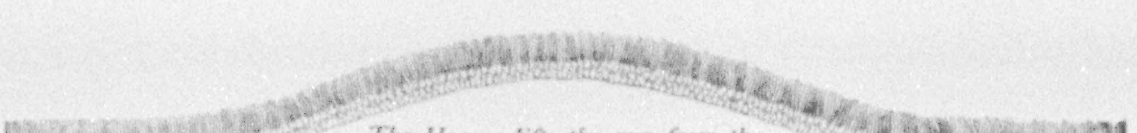


In those many homes long served by The Hoover the beauty even of rugs that are old in years is singularly well preserved. For this efficient cleaner gently beats out all destructive embedded grit. Briskly it sweeps up obstinate litter, straightens nap and freshens colors. Vigorously it cleans by air. Only The Hoover combines all these essentials of thorough cleaning. And it is the largest-selling electric cleaner in the world.

The HOOVER

It Beats — as it Sweeps — as it Cleans

The Hoover Suction Sweeper Company, North Canton, Ohio
The oldest makers of electric cleaners
Also made in Canada, at Hamilton, Ontario



The Hoover lifts the rug from the floor, like this — gently beats out its embedded grit, and so prolongs its life

Books That Add Charm to Every Fireside

Rich color volumes that add many delightful and profitable hours
to the indoor and outdoor life of adult and child

Winter Helps for Nature's Creatures

THE BOOK OF BIRDS

Text by Henry W. Henshaw, George Shiras, 3d, F. H. Kennard, Wells W. Cooke, and Gilbert Grosvenor.

250 bird portraits in full natural color by Louis Agassiz Fuertes

Haven't you often envied the friend who, on woodland walks, could identify every bird by name and discover nests hidden to your eyes?

The charming text by these deep students and friends of the birds and the beautiful paintings by Mr. Fuertes and many photographs of birds enable you to name and understand birds and keep them from starving in winter.

You, too, can fascinate adults and become the favored story-teller of children by reading these lovely treasure troves of bird lore and romance, or tell in your own words of their matings and rearing of nestlings, and of the deep purpose birds serve in Nature's wonderful and beautiful scheme of life.

A lovely rainy-day book, a delightful companion on every ramble in woodland, park, or garden—the Blue Book of the "high society" of the trees.

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The Outdoor Book Roosevelt Recommended

WILD ANIMALS OF NORTH AMERICA

By Edward W. Nelson, Chief, U. S. Biological Survey

177 Paintings in Full Color by Louis Agassiz Fuertes

This wonder book, beloved of Roosevelt, is a key to Nature's wonderful American "Zoo." It enables adult and child to identify the scurrying bit of fur or large animal he glimpses in woodland, meadow, or water as surely as do labels on the enclosures in city parks.

And then, Mr. Nelson, loving friend of all animals and deep scientific student and observer, with facile pen, lets us into the innermost secrets of these First Citizens of the Continent. From squirrel, mole, and field mouse to carnivorous Alaska Bear, he tells which are friends and to be trusted, which are enemies, and gives a new sense of the intelligence and instincts of Nature's four-footed tenants-at-large.

The magic brush of Mr. Fuertes has caught not merely form and color, but portrays the character of his subject.

Invaluable to teacher, camp director, men and women who love outdoor life, sportsmen, and the children, who never tire of this story-telling Noah's Ark.

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Ideal Gift to Suburban Friend, Sportsman, Child, or Teacher

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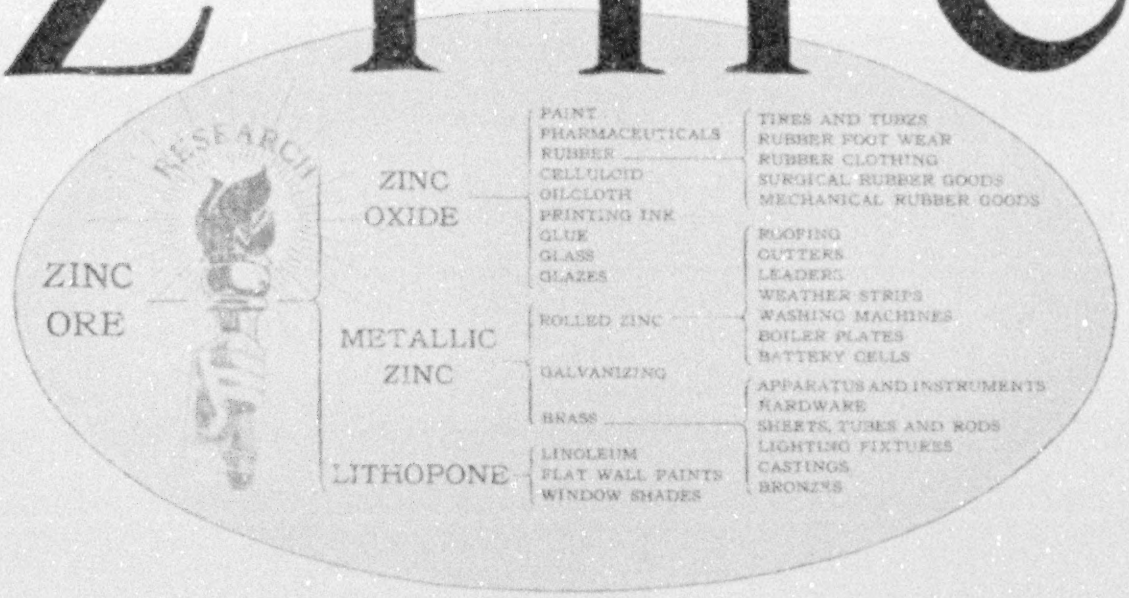
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And its development

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Today hundreds of industries depend upon zinc as a vital essential in the manufacture of their various products.

This great development of the application of zinc to industry is being extensively aided through cooperative, scientific research.

There are many articles and commodities in which zinc could be used to advantage. In the solution of your particular problems our Research Department will be glad to extend all possible aid.

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ESTABLISHED 1848
CHICAGO: Mineral Point Zinc Company, 1111 Marquette Building
PITTSBURGH: The New Jersey Zinc Co. (of Pa.), 1439 Oliver Building

Manufacturers of Zinc Oxide, Slab Zinc (Spelter), Spiegeleisen, Albalith, Lithopone, Sulphuric Acid, Rolled Zinc Strips and Plates, Zinc Dust, Salt Cake and Zinc Chloride

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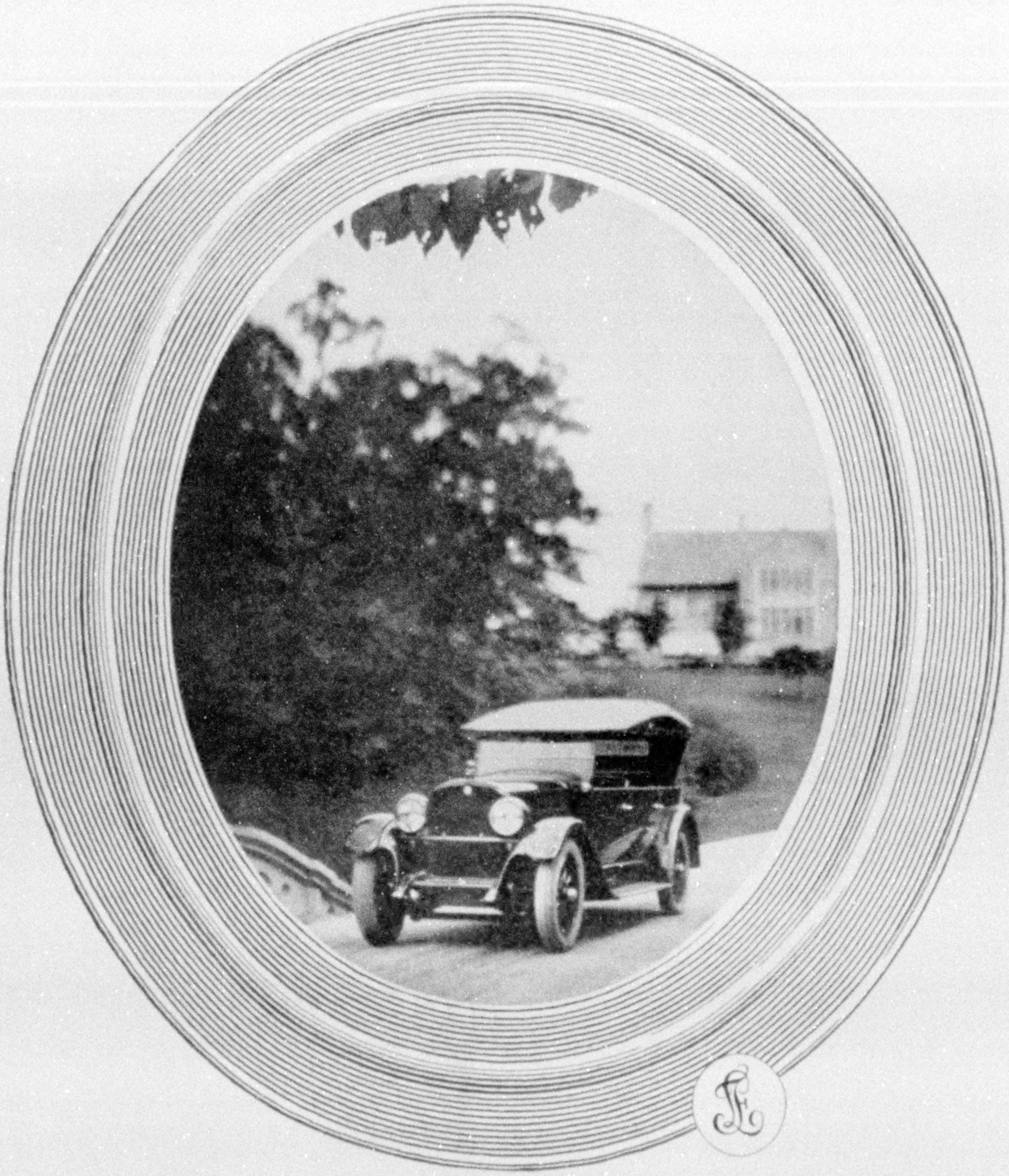
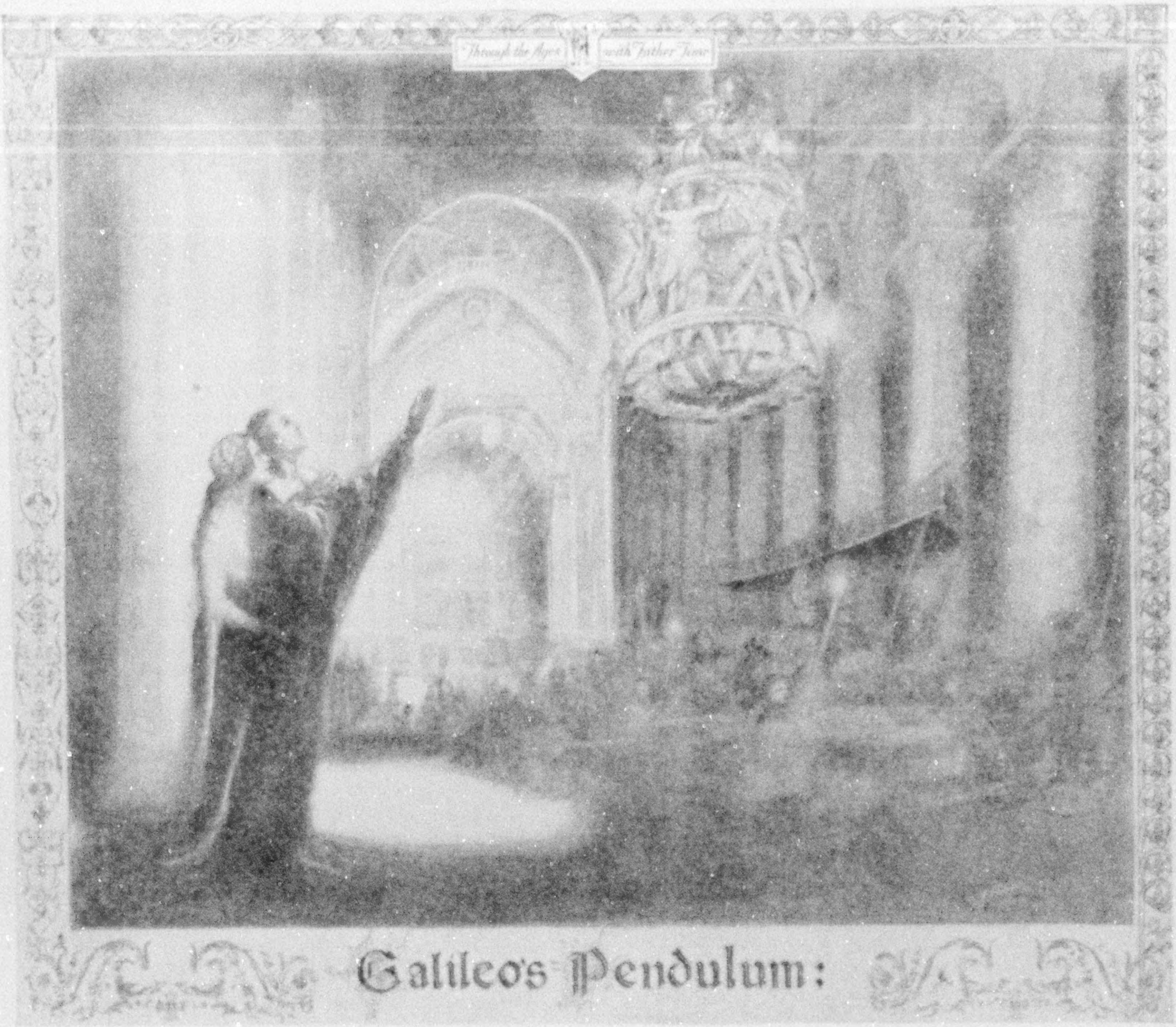


Merely to see the LaFayette is to place high estimate upon it. For it is the kind of car the eye singles out in the multitude and follows with candid admiration

LaFAYETTE MOTORS COMPANY at *Mars Hill* Indianapolis

LaFAYETTE


Through the Ages with Father Time

Galileo's Pendulum:

PAINTED FOR FATHER TIME BY HUGH RANKIN

SWINGING from the lofty dome of the ancient cathedral at Pisa, Italy, hangs a massive bronze lamp. Watch it sway, as Galileo and Marina watched it three hundred years ago, and you may notice a peculiar thing: the *distance* of its swing varies, but the *time* remains the same.

Countless eyes had idly gazed at it, but Galileo's were first to read its secret—the principle of isochronism, or "equal time." The seventeen-year-old philosopher had discovered *the law of the Pendulum!*

Sixty years later, hopelessly blind, he thought out its practical application to clock work, afterwards adapted to pocket watches in the form of the "pendulum balance."

American watch owners owe a debt of gratitude to Italy. For the "pendulum balance," or balance wheel, is a prime factor in the precision of those timekeeping marvels of our day—

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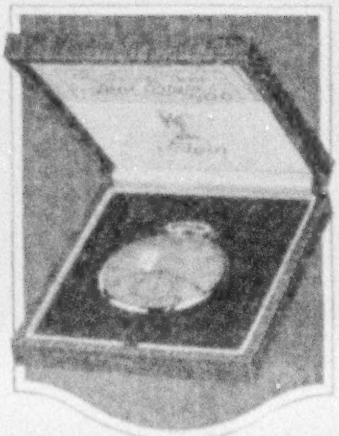
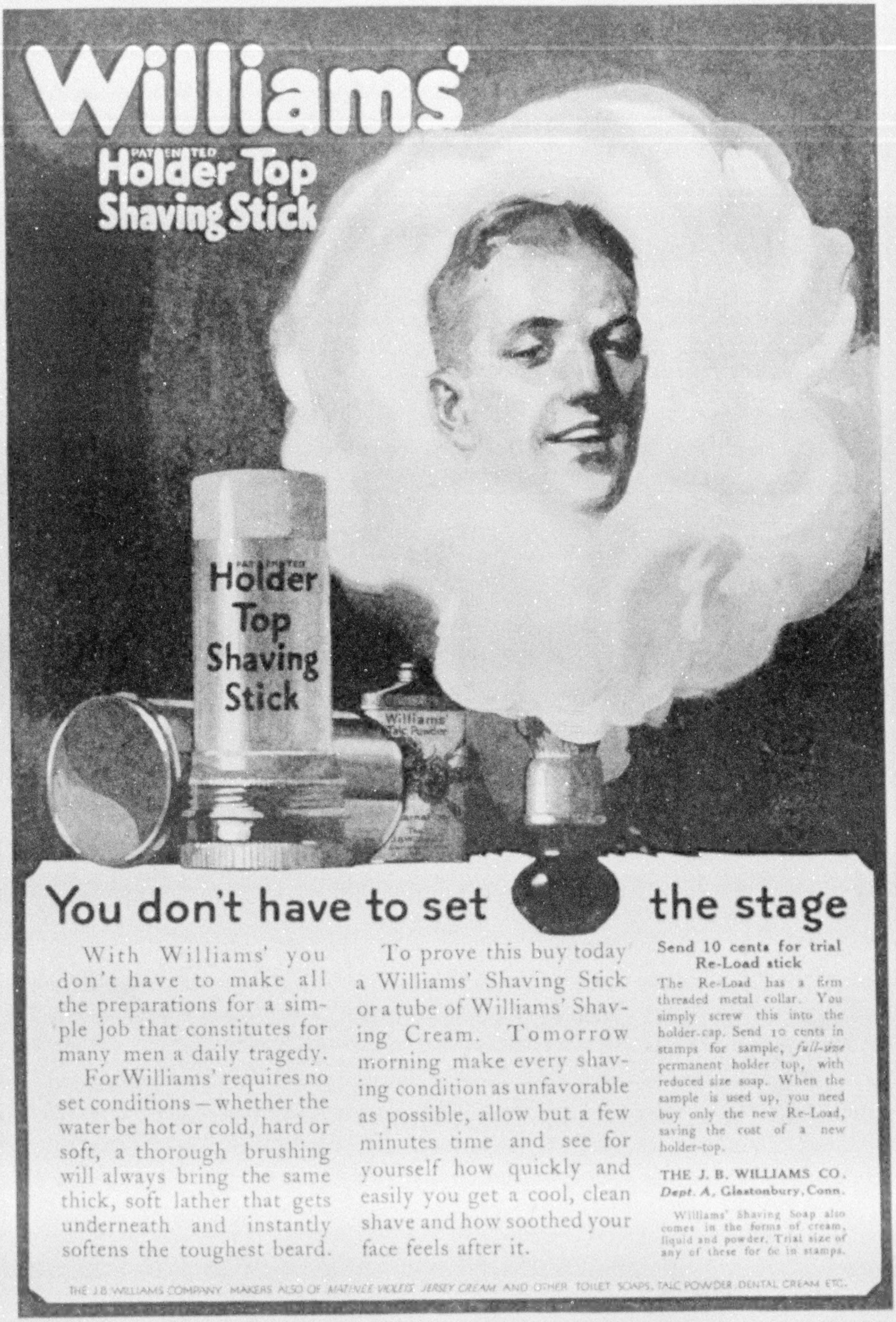


Elgin Watches

Press of Judd & Detweiler, Inc.
Washington, D. C.



Williams'

PATENTED Holder Top Shaving Stick

You don't have to set the stage

With Williams' you don't have to make all the preparations for a simple job that constitutes for many men a daily tragedy.

For Williams' requires no set conditions — whether the water be hot or cold, hard or soft, a thorough brushing will always bring the same thick, soft lather that gets underneath and instantly softens the toughest beard.

To prove this buy today a Williams' Shaving Stick or a tube of Williams' Shaving Cream. Tomorrow morning make every shaving condition as unfavorable as possible, allow but a few minutes time and see for yourself how quickly and easily you get a cool, clean shave and how soothed your face feels after it.

Send 10 cents for trial Re-Load stick

The Re-Load has a firm threaded metal collar. You simply screw this into the holder-cap. Send 10 cents in stamps for sample, *full-size* permanent holder top, with reduced size soap. When the sample is used up, you need buy only the new Re-Load, saving the cost of a new holder-top.

THE J. B. WILLIAMS CO.
Dept. A, Glastonbury, Conn.

Williams' Shaving Soap also comes in the forms of cream, liquid and powder. Trial size of any of these for 6c in stamps.

THE J. B. WILLIAMS COMPANY MAKERS ALSO OF *MATINEE VIOLETS JERSEY CREAM* AND OTHER TOILET SOAPS, TALC POWDER, DENTAL CREAM ETC.

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